INTERNATIONAL

Marine Engineering

SEPTEMBER, 1919

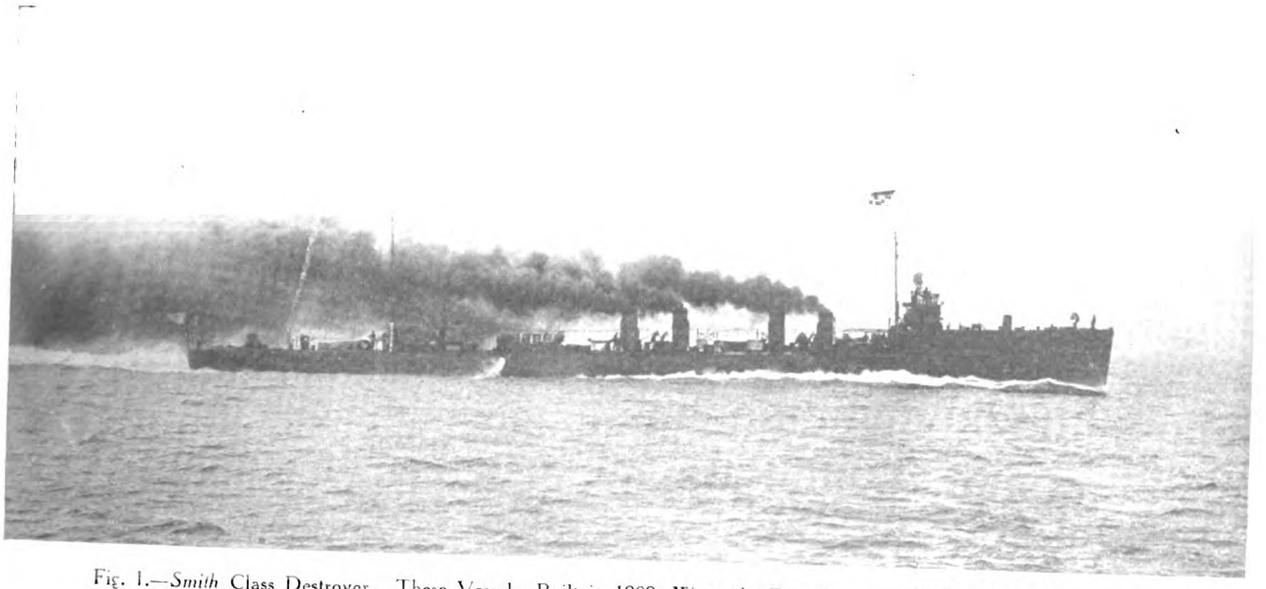


Fig. 1.—*Smith* Class Destroyer. These Vessels, Built in 1909, Were the First American Turbine-Driven Destroyers

The Evolution of the Destroyer

Remarkable Development of Present-Day Destroyer from Early Type Torpedo Boat—Rapid Advances in Boiler and Turbine Construction

BY COMMANDER S. M. ROBINSON, U. S. N.

PROGRESS in marine engineering has been very rapid during the past thirty years, but it is believed that the development of the torpedo boat has been more rapid than that of any other type of vessel. Undoubtedly the main reason for this rapid progress is that it takes a very short time, comparatively, to build a destroyer, so that the engineer can test his ideas and make several advances in the time required to build one battleship. It is certainly a far cry from the 22.5-knot *Cushing* to the 36.88-knot *Dent*. The *Cushing* was our first torpedo boat and the *Dent* is one of our latest destroyers. The following table and accompanying photographs give a comparison between the two boats:

	Cushing	*Dent*
Length overall	137 feet 6 inches	314 feet 4½ inches
Beam, extreme	15 feet ½ inch	30 feet 1½ inches
Draft	4 feet 6 inches	9 feet 0¾ inch
Displacement	91.34 tons	1,159 tons
Fuel	33 tons coal	288 tons oil
Speed	22.5 knots	36.88 knots
Horsepower	1,720 (indicated)	28,190 (shaft)
Revolutions per minute	370	467.5
Number of screws	2	2
Cruising radius at 15 knots' speed	990 knots	at 15 knots, 4,960 knots
Boilers	2 Thornycroft	4 White-Forster
Total heating surface	4,750 square feet	27,090 square feet
Total grate surface	76.6	
Ratio of heating surface to grate surface	62 to 1	

The *Cushing* was our first torpedo boat and was designed and built in 1890 by Nathaniel Herreshoff at the Herreshoff Works, Bristol, R. I. Inasmuch as she represents our maiden effort in this line of marine engineering, a brief description of her machinery may be of interest.

Machinery of the Cushing

She was equipped with twin screws, each driven by a five-cylinder, quadruple expansion engine. The cylinders were 11½, 16, 22½, 22½ and 22½ inches in diameter, respectively. The stroke was 15 inches. The engine supports were a distinct advance in engineering for that day and consisted of 1½-inch steel rods, braced diagonally, and forming the cap bolts of the main bearings; the latter were secured to a bed-plate consisting of a single sheet of ¾-inch wrought iron with openings cut for the cranks. The bed-plate was secured in a fore-and-aft direction to keelsons and was also supported under the main bearings of the high-pressure and after low-pressure cylinders, the other main bearings being entirely without support; but, owing to the extreme care taken in balancing, the engines ran without vibration.

The boat was equipped with two Thornycroft boilers each having 38.3 square feet of grate surface and 2,375 square feet of heating surface. The boilers also represented an advance in engineering, as the longitudinal seams in the drums were welded instead of riveted. The

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

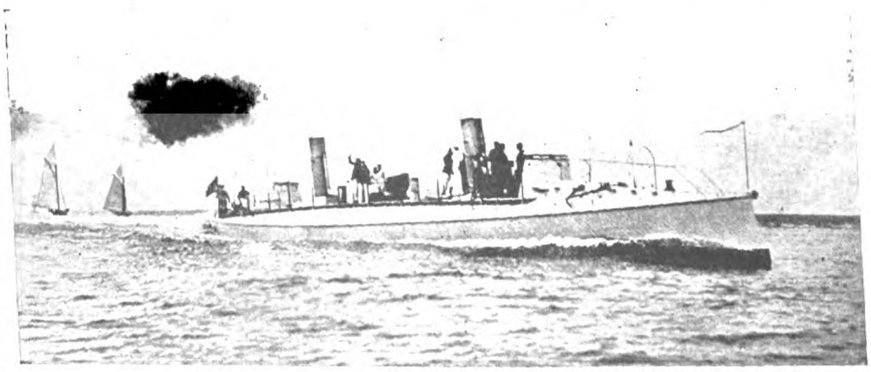


Fig. 2.—The *Cushing*, the First United States Torpedo Boat

boilers were designed for a pressure of 250 pounds per square inch.

For some time after the trials of the *Cushing*, the advance in torpedo boat engineering was limited by the progress in the design of propellers and the art of balancing engines. Like many other points of engineering, the screw propeller was not as well understood at that time as it is to-day, and many failures on trials were recorded due solely to improper propeller design. Also the higher speed of ship desired required higher engine speeds than had been the custom, with the result that vibration was so bad in many cases as to make it impossible to run at full power. However, both of these problems were successfully solved and the art of engine balancing, in particular, was carried to a high degree of success. This line of development reached its climax with the *Stewart* class, which were built in 1902.

The Last of the Reciprocating Engine Boats

The following table gives the general characteristics of these boats:

Length	245 feet
Beam	23 feet ¼ inch
Draft	6 feet 1¼ inches
Displacement	444 tons
Speed	29.3 knots
Indicated horsepower	8,000
Revolutions per minute	330
Number of screws	2
Fuel, coal	180 tons
Boilers	4 Thornycroft
Total heating surface	17,770 square feet
Total grate surface	237 square feet
Ratio of heating surface to grate surface	56.4 to 1
Radius of action at 12 knots	2,160 knots

These were the last of the reciprocating engine boats. We see that the speed has increased from 22.5 knots to 29.3 knots, the boiler pressure from 250 to 300 pounds, the indicated horsepower from 1,720 to 8,000, and the high-pressure cylinder from 11½ inches to 23 inches diameter. There is no doubt but what with the present-day methods of lubrication and other improvements of design, such as superheat, etc., destroyers of higher speeds could be built using reciprocating engines, but the improvement would not be great and the destroyer had just about reached its limitation as to speed.

Up to this time torpedo boats and destroyers had been regarded as coast and harbor defense vessels and long-distance cruising had not been carried out by them. The ordinary method of operation was to make short runs at high speed from a base, but in 1904 two of these boats, the *Preble* and *Paul Jones*, were sent to Panama to act as despatch vessels, and later in the year a flotilla of destroyers was sent from the Atlantic coast to the Asiatic station, via the Mediterranean. Both cruises proved conclusively that the destroyer was a reliable sea-going vessel and had a cruising radius that compared favorably with other types of ships. The fuel economy at low speeds was the greatest surprise of all. At that time so little was known regarding the fuel consumption at cruising speeds that when the cruise from San Francisco to Panama was first projected arrangements were made for coaling at San Diego and every few hundred miles from there to Panama. Great was the surprise when it was found that the trip could easily be made with only one stop and without any stop by taking a small deck-load of coal.

Adoption of the Turbine for Propulsion

The next step in destroyer design was the change to turbines for propulsion, and with this came the use of forced feed for lubrication. The first vessels to have this type of machinery were the *Smith* class, which were built in 1909. The following table gives the characteristics of these boats:

Length	293 feet 10½ inches
Beam	26 feet 4½ inches
Draft	8 feet ½ inch
Displacement	716 tons
Speed	28.35 knots
Shaft horsepower	9,946
Revolutions per minute	724
Number of screws	3
Boilers	4 Mosher
Total heating surface	18,003 square feet
Total grate surface	368.5 square feet
Ratio of heating surface to grate surface	48.86 to 1
Fuel, coal	304 tons
Cruising radius at 16 knots	2,800 knots

Fig. 3.—The *Cushing*, With a Displacement of 91.34 Tons and an Indicated Horsepower of 1,720, Developed a Speed of 22.5 Knots

Generated on 2024-09-12 08:00 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

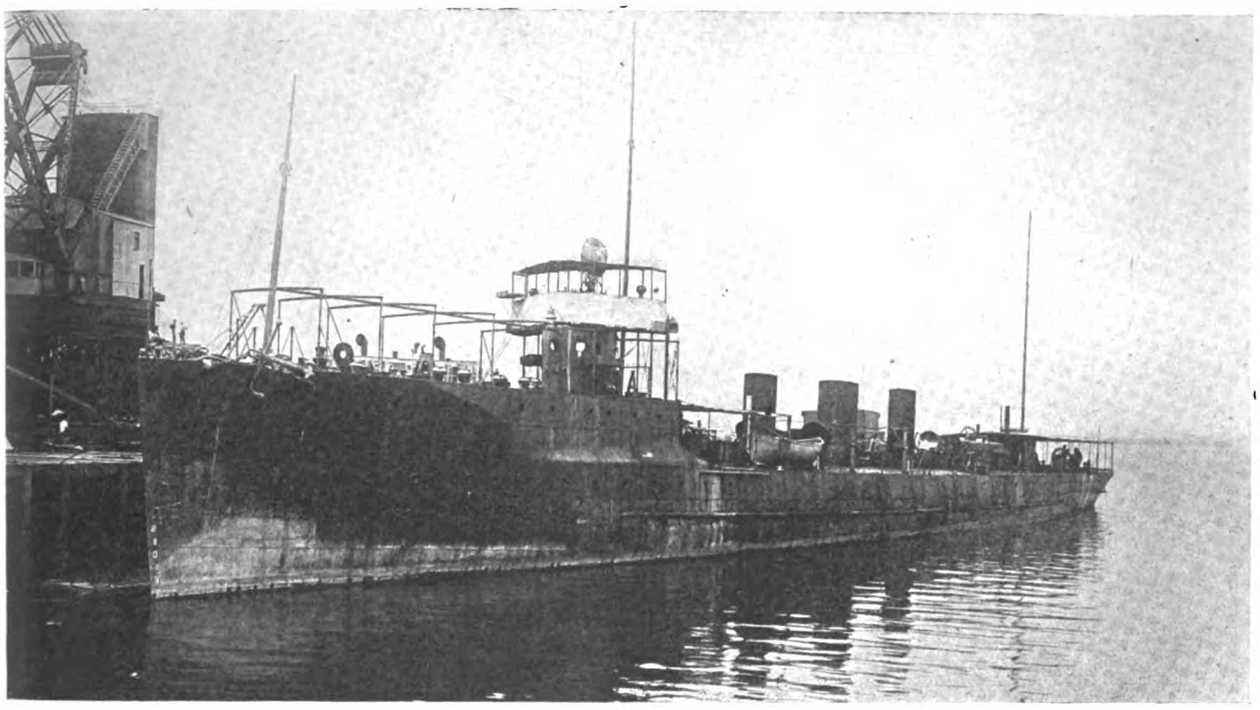


Fig. 4.—Destroyer *Roe*, Built at Newport News in 1910; Trial Speed, 29.60 Knots

With previous destroyers fitted with reciprocating engines it had been difficult to obtain machinery that would be reliable for high-speed runs for any considerable period of time. The difficulty was so great that most of the early destroyers were required to run full-speed trials of one-hour duration only. As soon as turbines were adopted, the trial requirements were immediately raised to four hours. The destroyer, being a high-speed boat, requires high speed of revolutions of the screw, and this condition, while ideal for turbines, is a very severe test for reciprocating engines. There is no doubt but what the destroyer was the main factor in developing turbines for marine purposes, as it presented a case where turbines were fairly well suited for the purpose without any great change from conditions on shore. This was not the case with battleships and other vessels having slow-speed screws, and the progress of turbines for marine propulsion would doubtless have been very slow if it had not been for the destroyers.

Blower Troubles Eliminated by Turbine Drive

Up to this time the forced draft blowers of destroyers had all been driven by light, high-speed, reciprocating engines and they were subject to the same troubles as were the main reciprocating engines, except that the troubles were exaggerated in the smaller engines. It was only natural, therefore, to adopt the turbine for driving the blowers as well as the propellers. It is no exaggeration to say that this change was almost as great an improvement as the adoption of the turbine for propulsion, as more breakdowns and failures on trials were due to blower trouble than to all other causes.

The first turbine-driven destroyers solved the problem of reliable high-speed machinery, but there was very little saving in weight, owing to the complications that were necessary to obtain reasonable economy at low speeds. In the fight between the turbine and reciprocating engine for supremacy in the field of marine propulsion it has always been the comparatively poor economy of the turbine at low speeds that has held it back. The accompanying sketches (Figs. 6-18), giving the machinery arrangements of all our turbine-driven destroyers from the *Smith* and *Lamson* up to the present time, show the progressive steps that have been taken in the evolution of the turbine for destroyer propulsion, and it will be seen that it has been a constant struggle to simplify the machinery and keep down the weights and at the same time provide a reasonable cruising radius at the slow speeds. We have had all combinations of direct-connected cruising turbines, direct-connected cruising reciprocating engines, and geared cruising turbines.

Oil Fuel Displaces Coal

The next advance in destroyer engineering was the substitution of oil fuel for coal. The advantages of this fuel were greater for destroyers than for other vessels, so it was adopted for this class of vessel at the earliest possible moment. The ability to run without making smoke, to

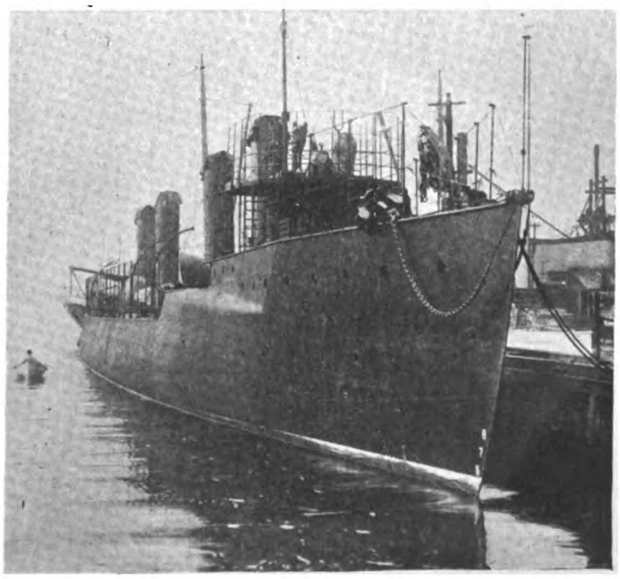


Fig. 5.—*Chauncey* Class Destroyer (1900-1902)

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

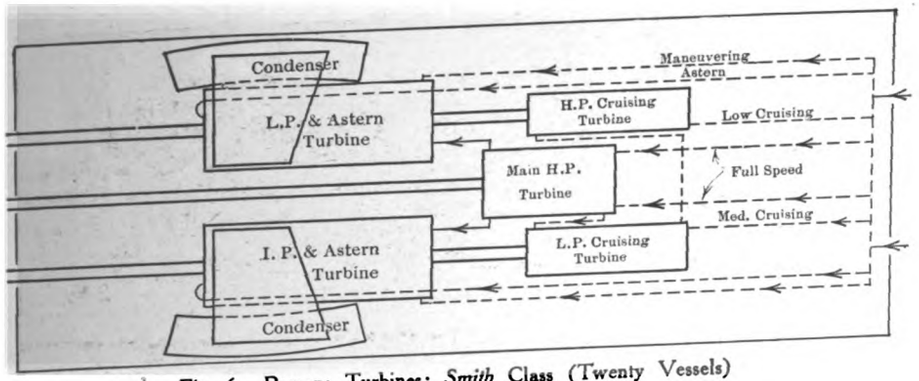


Fig. 6.—Parsons Turbines: *Smith* Class (Twenty Vessels)

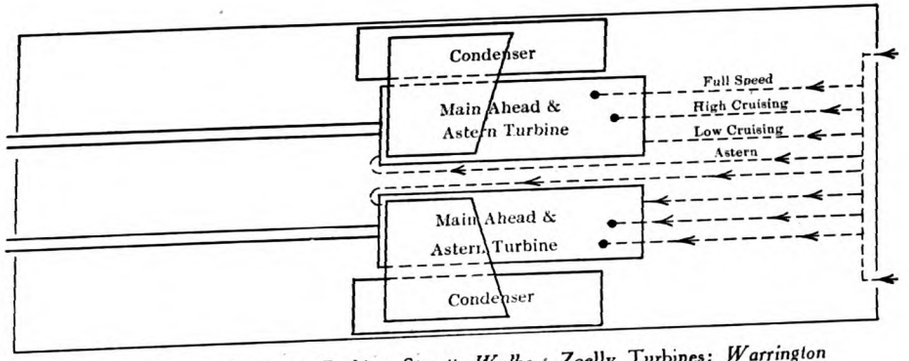


Fig. 7.—Curtis Turbines: *Perkins, Sterett, Walke.* Zoelly Turbines: *Warrington*

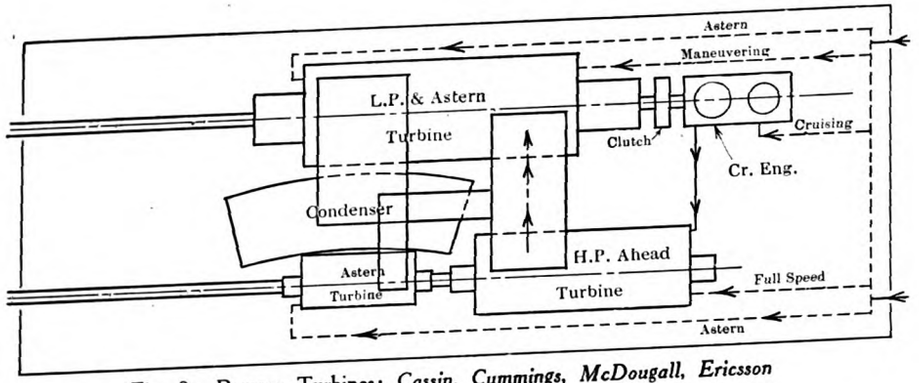


Fig. 8.—Parsons Turbines: *Cassin, Cummings, McDougall, Ericsson*

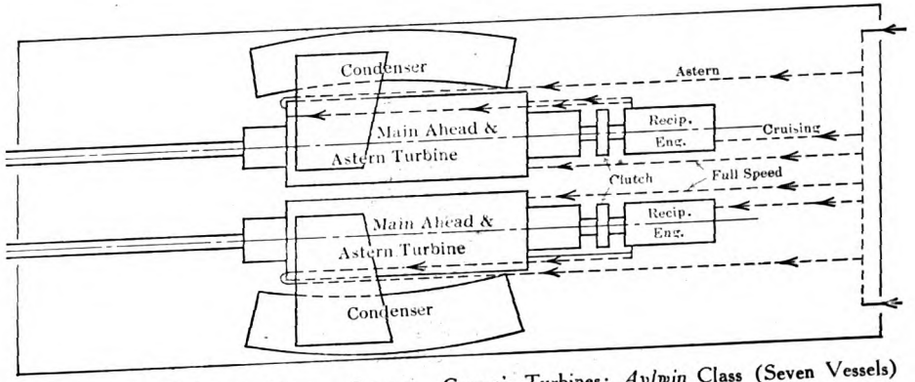


Fig. 9.—Curtis Turbines: *Downes, Duncan.* Cramp's Turbines: *Aylwin* Class (Seven Vessels)

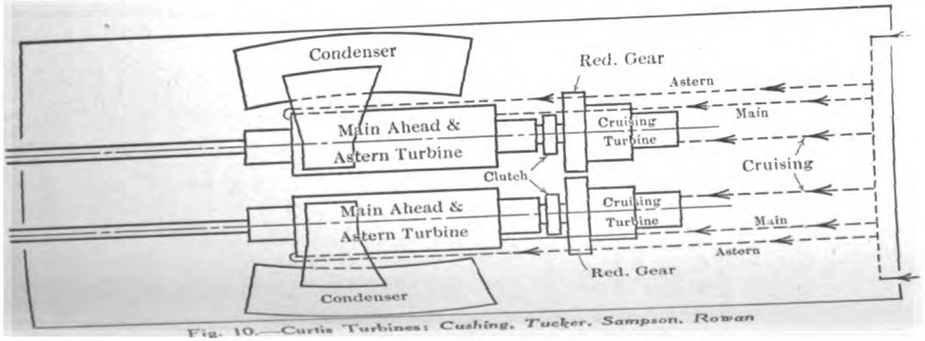


Fig. 10.—Curtis Turbines: *Cushing, Tucker, Sampson, Rowan*

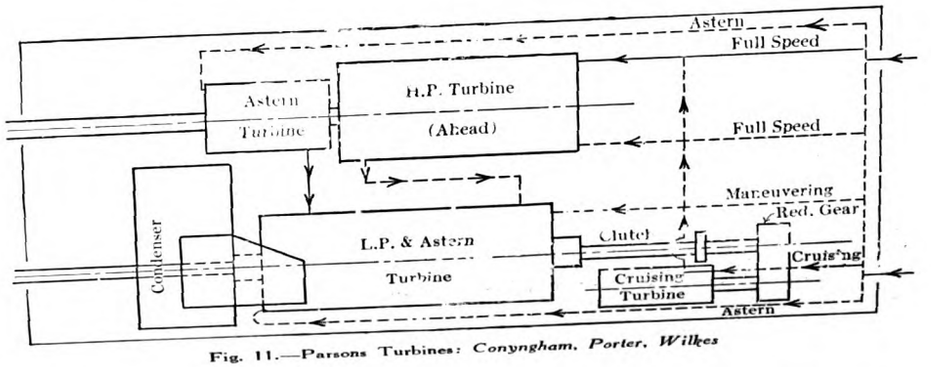


Fig. 11.—Parsons Turbines: *Conyngham, Porter, Wilkes*

Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Generated on 2024-09-12 07:51 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

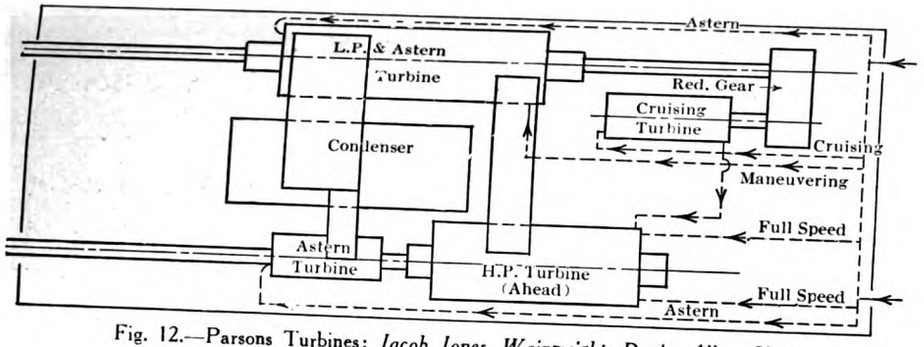


Fig. 12.—Parsons Turbines: *Jacob Jones, Wainwright, Davis, Allen, Shaw*

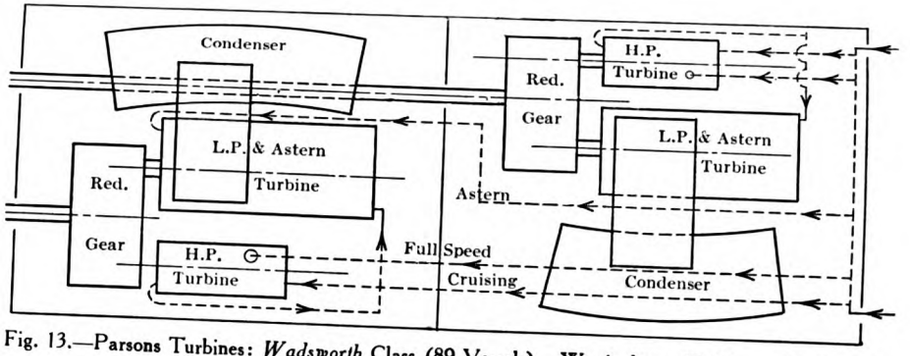


Fig. 13.—Parsons Turbines: *Wadsworth* Class (89 Vessels). Westinghouse Turbines: *Wadsworth* Class (40 Vessels)

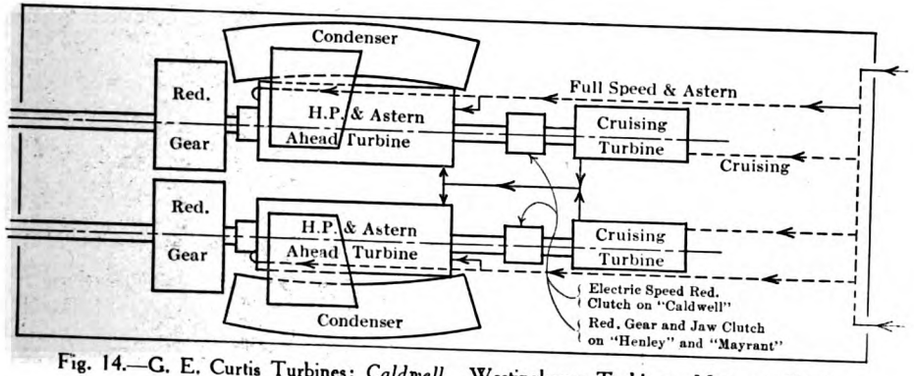


Fig. 14.—G. E. Curtis Turbines: *Caldwell*. Westinghouse Turbines: *Mayrant, Henley*

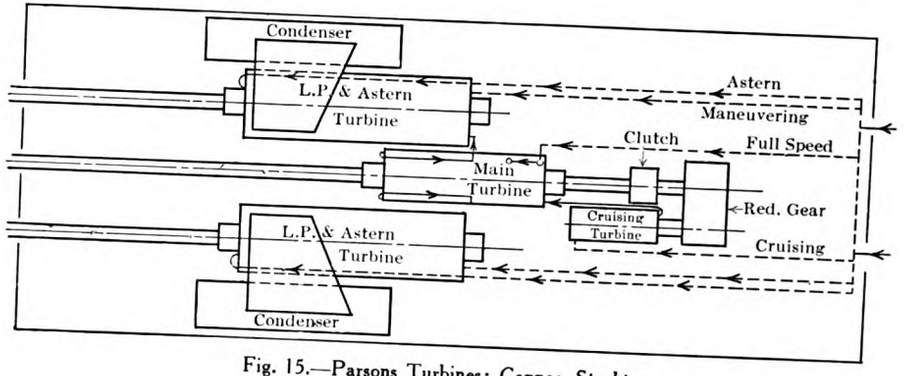


Fig. 15.—Parsons Turbines: *Conner, Stockton*

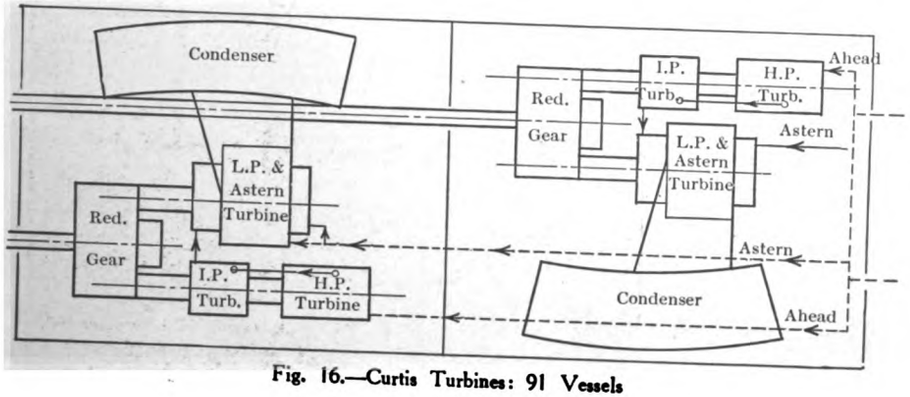


Fig. 16.—Curtis Turbines: 91 Vessels

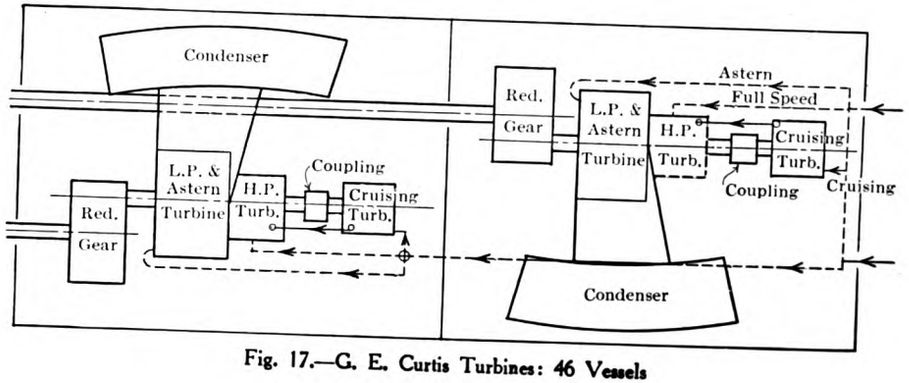


Fig. 17.—G. E. Curtis Turbines: 46 Vessels

Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

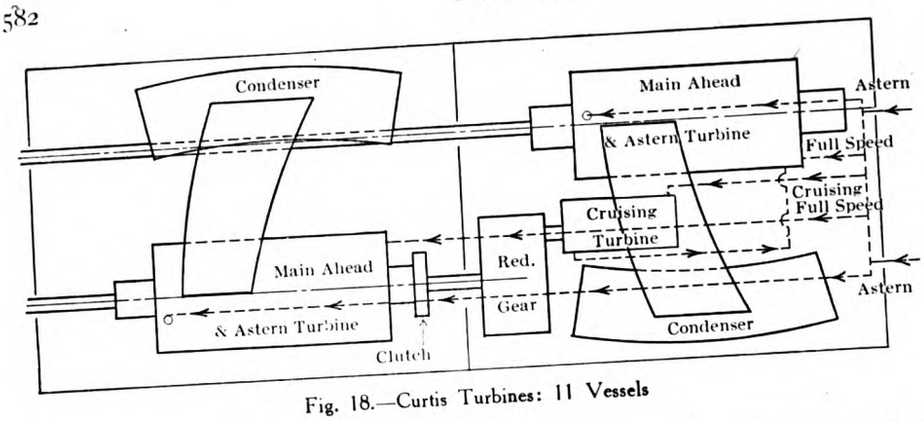


Fig. 18.—Curtis Turbines: 11 Vessels

maintain full power till the fuel is exhausted and to go quickly from low speed to full speed, all are ideal conditions for a destroyer. When the increased facility of refueling (including the ability to refuel at sea) and the increased cruising radius are added to the above advantages, it becomes apparent that the destroyer did not really fulfill its requirements until it was given oil as a fuel.

The *Paulding* class comprised the first oil-burning destroyers and they were built in 1910. The following table gives their principal characteristics:

Length	293 feet 10½ inches
Beam	26 feet 4½ inches
Draft	8 feet 1¾ inches
Displacement	711 tons
Speed	32.8 knots
Shaft horsepower	17,393
Revolutions per minute	903
Number of screws	3
Boilers	4 Normand
Total heating surface	19,321 square feet
Fuel oil	241 tons
Cruising radius at 16 knots	3,000 miles

While the propeller speeds of the destroyer were such as to allow better turbines than in the case of other ships, the speeds were not high enough for the best turbine practice, and in the attempts to improve this condition the propeller speeds used were considerably higher than should have been to get the best propeller efficiency. It was therefore natural to turn to the reduction gear as soon as it became sufficiently developed for the purpose. Here again the destroyer was the pioneer and led the way in the use of the mechanical reduction gear. This was natural, since the speed reduction was not nearly so great as with other types of ships (being only about 5 to 1), and therefore was a very much easier problem to solve; also the advantages gained were much greater than with other types of ships, owing to the great advantages of weight saving in this type of vessel.

Reduction Gears Applied to Main Propelling Units

The *Wadsworth*, built in 1915, was the first vessel to be fitted with reduction gear for the main unit. The following table gives the general characteristics of the vessel:

Length	310 feet
Beam	29 feet 8½ inches
Draft	9 feet 4½ inches
Displacement	1,050 tons
Speed	30.7 knots
Shaft horsepower	16,100
Revolutions per minute	460
Number of screws	2
Boilers	4 Normand
Total heating surface	21,500 square feet
Fuel oil	326 tons
Cruising radius at 16 knots	5,640 knots

The arrangement of the machinery of the *Wadsworth* is shown in Fig. 13, and it will be noted that it is very simple, consisting of a high-pressure and a low-pressure turbine driving pinions meshing with the same gear, there being only two gears and two main shafts. The *Wadsworth's* machinery contains several novel features. The gear is a single helical gear and is arranged to take part of the propeller thrust direct and transmit it to the turbines, where it is balanced by steam pressure; the re-

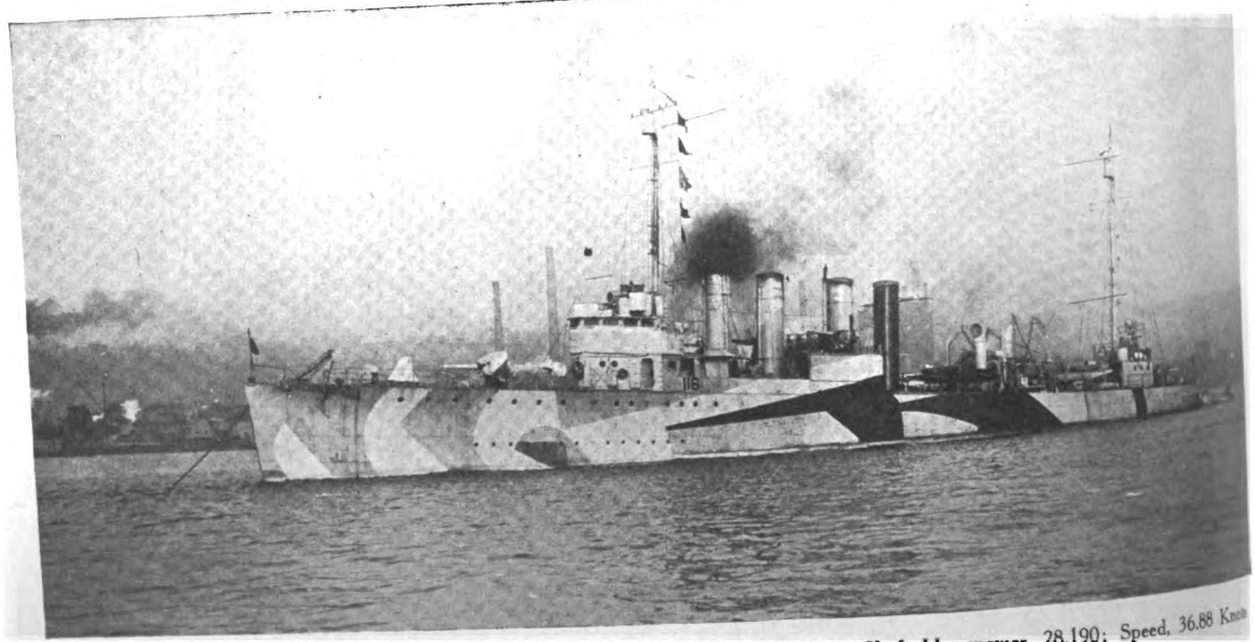


Fig. 19.—U. S. S. *Dent*, Latest Type American Destroyer; Displacement, 1,159 Tons; Shaft Horsepower, 28,190; Speed, 36.88 Knots

Generated on 2024-09-12 08:02 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

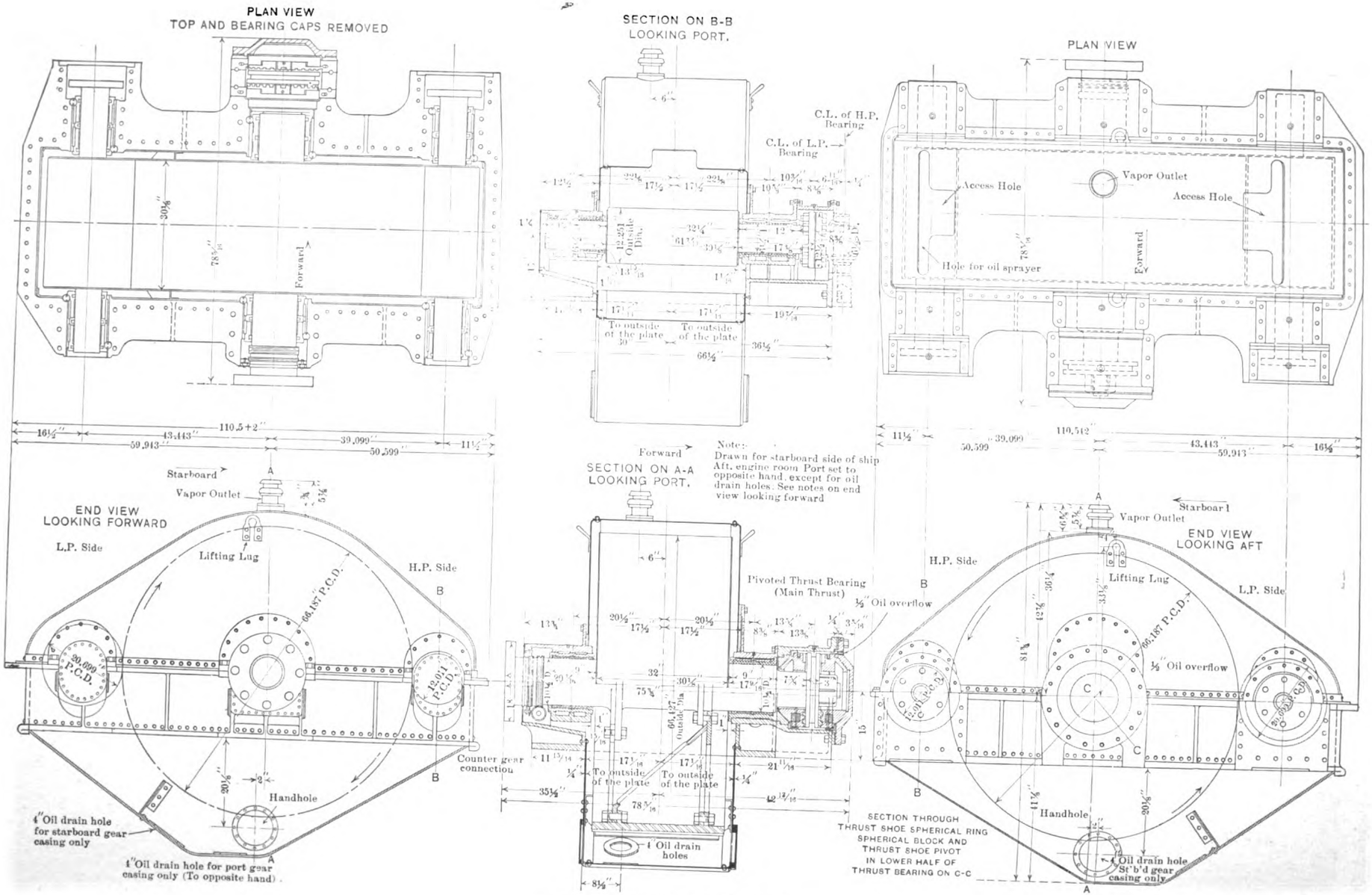


Fig. 20.—Details of Reduction Gears

Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
Digitized by Google
Generated on 2024-09-12 07:51 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

mainder of the trust is taken by a thrust bearing which is of the pivoted segmental (Kingsbury) type. This was the first use of this type of thrust bearing in the navy, but its use has since become practically universal. The single helical gear has not been used in the later destroyers, which are of much greater horsepower (requiring longer pinions), but it has proved very satisfactory on the *Wadsworth*.

The *Wadsworth* really marked the end of the era of direct-connected turbines, although several destroyers were built after this date with direct-connected turbines. During the war it was not possible to obtain gears in such great numbers as they were needed, so a certain number of direct-connected turbines were installed. These reached a high degree of perfection in the boats turned out by Newport News Shipbuilding & Drydock Company, as these boats made over 35 knots on their full power trials.

Boiler Capacity Increased to Obtain Higher Speeds

The next step in the evolution of the destroyer was to increase the speed by a large increase in boiler capacity. These boats were built during the war under great pressure and various expedients were considered in the hope of expediting production. It was even considered reducing the speed, reducing the number of boilers, etc., but none of these offered any hope of greatly increased production, so it was decided to build the best boat possible under the conditions. The data on this class of vessel are given in the first page of this article in comparison with the *Cushing*.

The propelling machinery is located in two separate compartments, one forward of the other. It consists of geared turbines of the Parsons type, there being a high-pressure and low-pressure turbine in each engine room; the high- and low-pressure turbine pinions mesh with one gear, which is on the propeller shaft. The backing turbine is located in the after end of the low-pressure turbine casing. The high-pressure turbine was designed to run at 2,988 revolutions per minute, and the low-pressure turbine at 1,775 revolutions per minute, for a shaft speed of 436 revolutions per minute, giving a reduction for the high pressure of 6.85 and a reduction for the low pressure of 4.07. The high-pressure turbine is arranged with two connections for live steam, one being for cruising and the other for full power. The turbine thrust is taken by two 9-inch Kingsbury thrusts.

Construction of Reduction Gear

Fig. 20 shows the general arrangement of one of the gears. Each reduction gear consists of two double helical pinions meshing into a single gear. The pinions are of nickel steel; the gear rims are carbon steel forgings and the gear centers are cast steel. The high-pressure pinion has a pitch diameter of 9.91 inches, the low pressure a diameter of 16.69 inches, and the gear a diameter of 67.96 inches. The total length of tooth face is 37⅞ inches The spiral angle of the teeth is 39 degrees 53 minutes. The high-pressure pinion has 41 teeth, the low pressure 69 teeth, and the gear 281 teeth. The oil for lubricating the gears is taken from the forced lubrication system and is supplied through spray nozzles. The main thrust bearing is a 21-inch Kingsbury bearing with its housing built into the gear casing.

The boiler plant consists of four White-Forster boilers arranged in two watertight compartments. The boilers have a total heating surface of 27,000 square feet. Each boiler has an independent smoke pipe 20 feet high above the main deck. The boilers are designed to burn oil fuel on the mechanical pressure atomization principle.

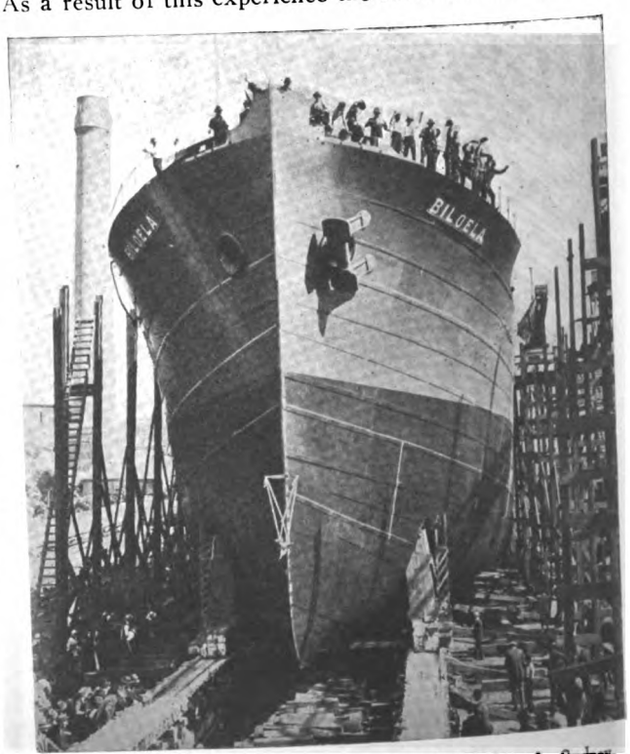
The oil-burning equipment consists of two light-service booster pumps, four heavy-pressure duplex service pumps, and two oil heaters. Half of this is located in each of the two firerooms. The booster pumps take a suction from the storage tanks and deliver to the service pumps, which deliver oil to the burners through the oil heaters. Oil is supplied at a pressure of about 250 pounds per square inch. A small hand-pump is located in each fireroom for raising steam. Air for combustion is supplied at a pressure of about 8-inch water pressure by six vertical turbine-driven blowers, three being in each fireroom.

Destroyer Approaching Scout Cruiser Type

The present destroyer, in size and speed, approaches very closely to the scout cruiser, and it is very probable that the latter will be displaced by destroyers of somewhat greater tonnage than the *Dent* class and which will have considerably more speed than the scout cruiser. The tendency is toward a merging of the two types. However, it is too much to expect that the development of the destroyer will continue at the same rapid pace that it has set during the past five years of war.

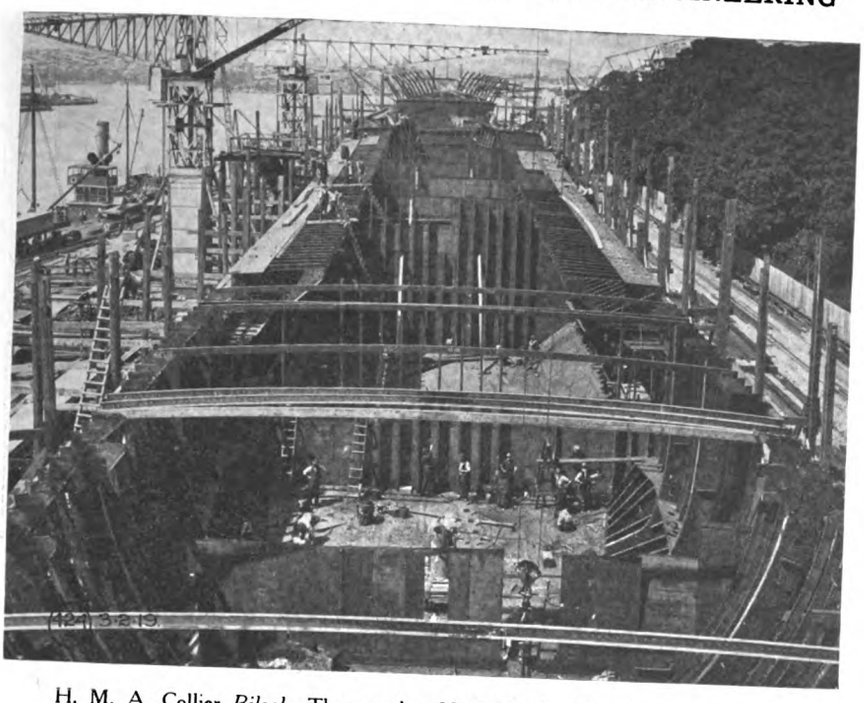
10,000-Ton Collier Built in Australia

THE British auxiliary collier *Biloela* was launched in April, 1919, at the Commonwealth Naval Dockyard, Sydney, Australia. She is the largest of the ships constructed in Australia, and is the first to be entirely built with materials fabricated in the Commonwealth. When loaded to capacity, the *Biloela* displaces 10,000 tons, which is about 2,200 tons greater displacement than any ship previously built in Australian yards. The collier was completed in five and a half months, which is a creditable performance considering the fact that labor troubles and delays of material were experienced continually. Previous to this attempt the establishment at Sydney had constructed the cruisers *Brisbane* and *Adelaide*, both ships requiring a great degree of care in the structural fitting. As a result of this experience the same care was put into



Launching of Collier *Biloela* at Naval Dockyard, Sydney, April 10, 1919

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN



H. M. A. Collier *Biloela* Three and a Half Months After Laying of Keel

the building of the *Biloela*, so that she is an example of fine workmanship throughout.

Special features of construction distinguish the *Biloela* from the ordinary tramp or freighter, which fit her for duties as a coal, oil and fresh water carrier for the ships of the auxiliary fleet. The coal is carried in self-trimming holds, designed to facilitate the use of grabs. Oil is contained in the double bottom and in hold tanks, while the fresh water is carried in topside tanks.

The *Biloela* has a length of 382 feet overall, a beam of 54 feet and a draft when displacing 10,000 tons of 22 feet 6 inches. She is of the single deck type, with a deadweight carrying capacity of 7,000 tons. Her holds are arranged to carry 6,465 tons of coal, while the bunkers have a capacity of 1,007 tons. If oil is to be carried, the tanks provide space for 1,068 tons. Her water tanks will hold 662 tons. In addition to her equipment as a collier, modern cargo handling machinery is installed so that the ship may be converted into a general carrier for the coast trade. There are four main holds unobstructed by pillars, with hatches, 30 feet by 32 feet 6 inches. Eleven derricks, each of five tons capacity, are operated by steam winches. When handling 1½ tons of coal contained in bags, the speed of lifting is 250 feet per minute. Her hull is particularly strong and includes a ¾-inch tank top, enabling the ship to carry a concentrated cargo without danger of unduly straining the structure.

Her accommodations compare favorably with the best of the ocean-going cargo vessels. The captain and deck officers are amidships, while the chief engineer and crew have quarters aft under the poop.

With the exception of a few thin plates, all the the steel used in the vessel was rolled in the works of the Broken Hill Proprietary Company, Limited, Newcastle. The equipment of this plant was not designed for rolling ship plates, but the results obtained were entirely satisfactory, although the plates were somewhat smaller than had been originally intended.

The machinery for the *Biloela* was constructed at the Sydney yard, according to the best practice for this type of vessel. Her propelling machinery consists of an inverted triple expansion engine having cylinder diameters of 26 inches, 41½ inches, and 67 inches, with a stroke of 48 inches. It is capable of developing 2,500 indicated horsepower under normal conditions. Steam at 180 pounds per square inch pressure is generated in four watertube boilers of the Babcock & Wilcox type having a heating surface of 9,600 square feet and a grate area of 233 square feet. Air is supplied on the Howden principle of forced draft, and will burn fuel of low calorific value and with a high percentage of ash efficiently. Brickwork for the boilers is standard, so that it may be easily renewed. Sufficient steam space is provided, so that priming in the boilers is unnecessary. A return flow condenser, having a surface of 2,300 square feet, provides ample capacity for the exhaust steam.

An Edwards air pump, 2 feed and 2 bilge pumps are driven by the main engines. Steam and hand turning gear are fitted to the engines.

The thrust block is of the Michell design, having but one collar running in an oil bath to take the entire thrust. The propeller is 17 feet 6 inches in diameter, with the same pitch, and has a speed of 70 revolutions per minute. Several new features have been introduced in the machinery of the vessel, and include a safety valve of the full bore type, as fitted in all Admiralty vessels, and a main regulating valve with a superimposed jockey valve.

Auxiliary equipment was built by firms in various parts of Australia. The circulating pump, electrical equipment, evaporators and fan engines were supplied from Melbourne; the main feed and oil fuel pumps, steering engine, bilge and ballast pumps from South Australia; the windlass capstan, ash hoist, coaling winches, general service pump, fresh water pump and forgings for the propeller and crank shafts from Sydney.

The main engine feed pumps draw from the hot well and discharge to the heater. Feed water gravitates from the heater to the main feed pumps, and is thence discharged to the boilers. Filtering is effected between the main engine feed pump and the heater.

As the vessel is designed to carry oil fuel in addition to coal, the main ballast line of piping is adapted to deal with fuel oil in addition to its ordinary duties. Two centrifugal pumps, having a total capacity of 150 tons per hour, are fitted to handle the oil.

BOILER EXPLOSION.—The British Board of Trade has recently issued a report as to a boiler explosion which occurred on February 7 last on board the steamship *Izaston* when about 12 miles north of Yarmouth. The boiler was of the three-furnace marine cylindrical return-tube type, 15 feet 3 inches in diameter by 10 feet 3 inches long, and was built about 20 years ago. When the explosion took place a piece of the combustion chamber back plate close to one of the bottom stays of the center furnace in the starboard boiler was blown out, forming an opening through which the contents of the boiler escaped into the stokehold. The explosion, the report states, appears to have been due to local corrosion on the fire side of the combustion chamber plate. The corrosion was probably caused by leakage from the adjacent stay.

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Fig. 1.—Launching a 150-Foot Tug at Moore Plant of Bethlehem Shipbuilding Corporation, Ltd., Elizabeth, N. J.

The Bethlehem Shipbuilding Corporation, Ltd., Makes a World's Record in Shipbuilding

DURING the month of July of this year the Bethlehem Shipbuilding Corporation, Ltd., established a world's record for ship deliveries by completing and delivering to their owners nineteen vessels, consisting of ten 35-knot seagoing torpedo-boat destroyers and two large submarines for the United States Navy, and five large tank steamers and two ocean-going tugs for the United States Shipping Board Emergency Fleet Corporation.

Such a record has never been approached by any other shipbuilding company in the United States or Europe. During the same month all of the other American shipyards combined, some thirty-five, delivered only sixty-seven vessels, including destroyers and submarines, or an average of less than two ships per yard. The largest number of vessels delivered during the same period by any other single corporation was only eight ships, while from all the other yards building naval vessels but three destroyers and one submarine were delivered.

When it is understood that all the engines, boilers and deck machinery required for these nineteen vessels were built by the Bethlehem Corporation, as well as the complete hulls, some idea of the magnitude of this accomplishment can be gained, especially when it is realized that for the destroyers alone Curtis turbine engines totaling over a quarter of a million shaft horsepower were constructed, and also the Yarrow type watertube boilers necessary to generate the steam for this enormous horsepower.

The fact must not be overlooked that it was necessary for every piece of material used in building these vessels to pass the rigid government inspection, which, in the case of destroyers and submarines, is the most exacting inspection known, and each vessel successfully underwent the severe government trials before being accepted for delivery.

To supply the shipyards with the steady flow of material necessary for the accomplishment of such rapid construction was in itself a record, as over 78 000 tons of material were used.

The building of these vessels was carried out on a regular eight-hour schedule and not under highly intensified war production conditions, so that the large number of deliveries seems all the more remarkable and can give some idea of what our country was preparing for the Hun submarines during 1919, as under war conditions these deliveries would have been materially increased.

The scientific construction of seagoing 35-knot torpedo-boat destroyers has been so efficiently developed by the Bethlehem Shipbuilding Corporation, Ltd., that a destroyer has been completely built and delivered to the Government in 174 working days. To build such a vessel before the war required approximately one and a half years.

July is a month of records for the Bethlehem Shipbuilding Corporation, Ltd., for in July of last year the

Generated on 2024-09-12 09:02 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

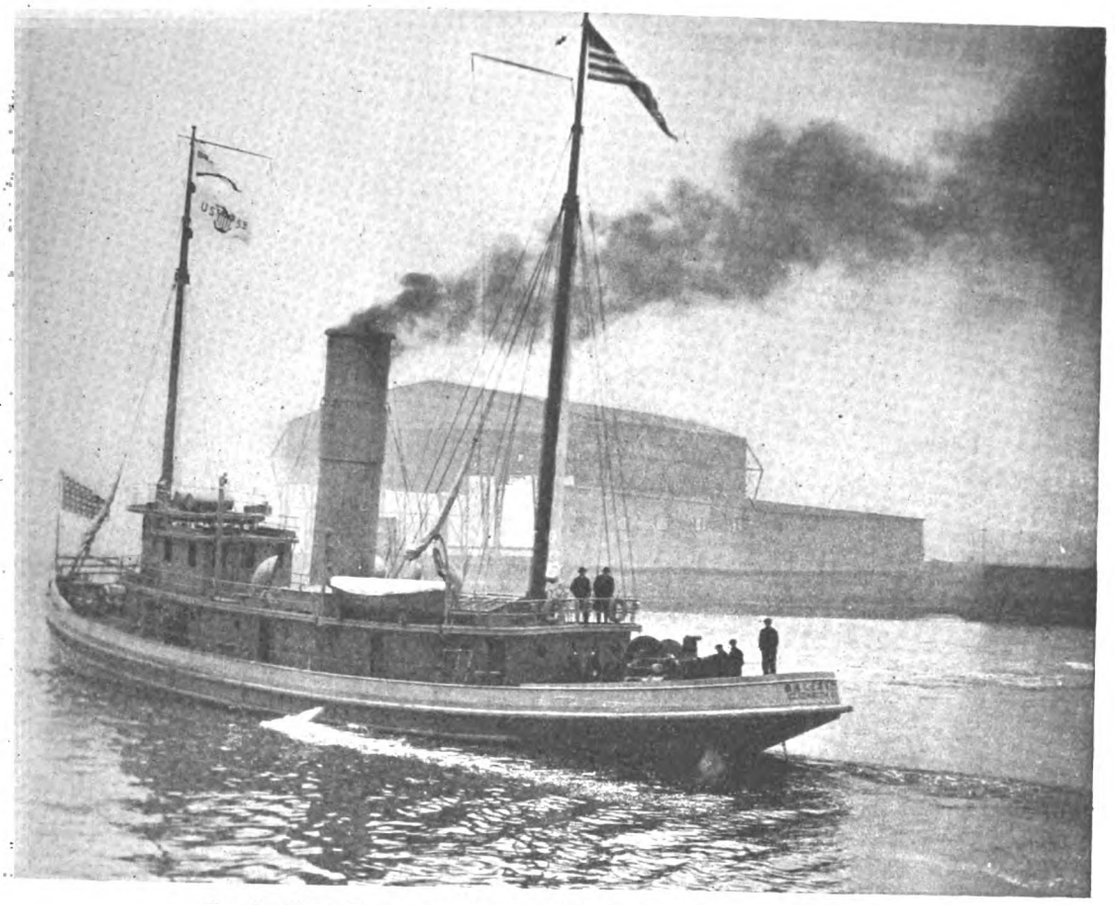


Fig. 2.—Trial Trip of Tug *Baleshed*, March 7, 1919

Union plant of this corporation, located at San Francisco, launched a 12,000-ton freight steamer—the *Invincible*—in 23 working days and 23 working hours, and delivered this vessel in 66 working days from the laying of the keel, establishing another world's record, as over 13,500 tons of steel were fabricated and over 1,000,000 rivets were driven in the building of this ship.

At the present rate the Bethlehem Shipbuilding Corporation, Ltd., would deliver over one-fourth of the steel vessels completed in America this coming year, and two and one-half times as many vessels as any other shipbuilding company. Such production can only be obtained by a highly efficient organization having at its disposal the most up-to-date facilities for the manufacture of all articles needed in the construction of ships. The coordination of all the Bethlehem shipbuilding interests in one central office at Bethlehem has made such an organization possible.

MERCHANT SHIPBUILDING IN THE WORLD.—Lloyd's returns show that on June 30, 1919, there were 2,526 merchant vessels (each of 100 gross tons or over), aggregating 8,017,767 gross tons, under construction in the world's shipyards. Before the war the largest tonnage under construction in the world was 3,445,000 gross tons on June 30, 1913. On that date merchant ships under construction in the shipyards of the United Kingdom numbered 543 of 2,003,241 gross tons. On June 30 of this year 994 vessels of 3,874,143 gross tons were under construction in the United States, as against 782 vessels of 2,524,050 gross tons in the United Kingdom. The above figures do not include shipbuilding in Germany, as the figures for that country are not yet available.

Ocean-Going Tugs Built at the Moore Plant of the Bethlehem Shipbuilding Corporation, Ltd.

DURING this month the last of twenty 150-foot, 11-knot ocean-going tugs contracted for by the United States Shipping Board Emergency Fleet Corporation will be delivered by the Moore plant of the Bethlehem Shipbuilding Corporation, Ltd., Elizabeth, N. J. The first of these vessels was launched on November 20, 1918, and up to the date of going to press with this issue eighteen of the tugs had been launched, with the remaining two scheduled for launching on September 10. The entire contract will be completed this month.

The tugs are 150 feet long overall, 141 feet 3½ inches long between perpendiculars, 27 feet 6 inches molded beam, and 16 feet 8 inches molded depth at the lowest point of sheer. Although the guaranteed speed is 11 knots, it is worthy of mention that in no case has the trial speed been less than 11.25 knots.

Propulsion is by an inverted, direct-acting, triple-expansion reciprocating engine with cylinders 17 inches, 25 inches and 43 inches diameter with a common stroke of 30 inches. The estimated horsepower is 800, but on speed trials 1,000 horsepower has been developed.

Steam is furnished at a working pressure of 180 pounds per square inch by two Scotch boilers, 11 feet 6 inches inside diameter and 12 feet long over the heads, having a total heating surface of 1,550 square feet. Sixteen of the tugs are coal burners and four oil burners.

Nine of the vessels are equipped with a towing bit and steam capstan located at the after end of the deckhouse. The balance are equipped with American and Lidgerwood

Generated on 2024-09-12 08:04 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Generated on 2024-09-12 07:51 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

ONE HUNDRED AND FIFTY-FOOT, 11-KNOT OCEAN GOING TUG

Built at Moore Plant, Bethlehem Shipbuilding Corporation, Ltd., Elizabeth, N. J.

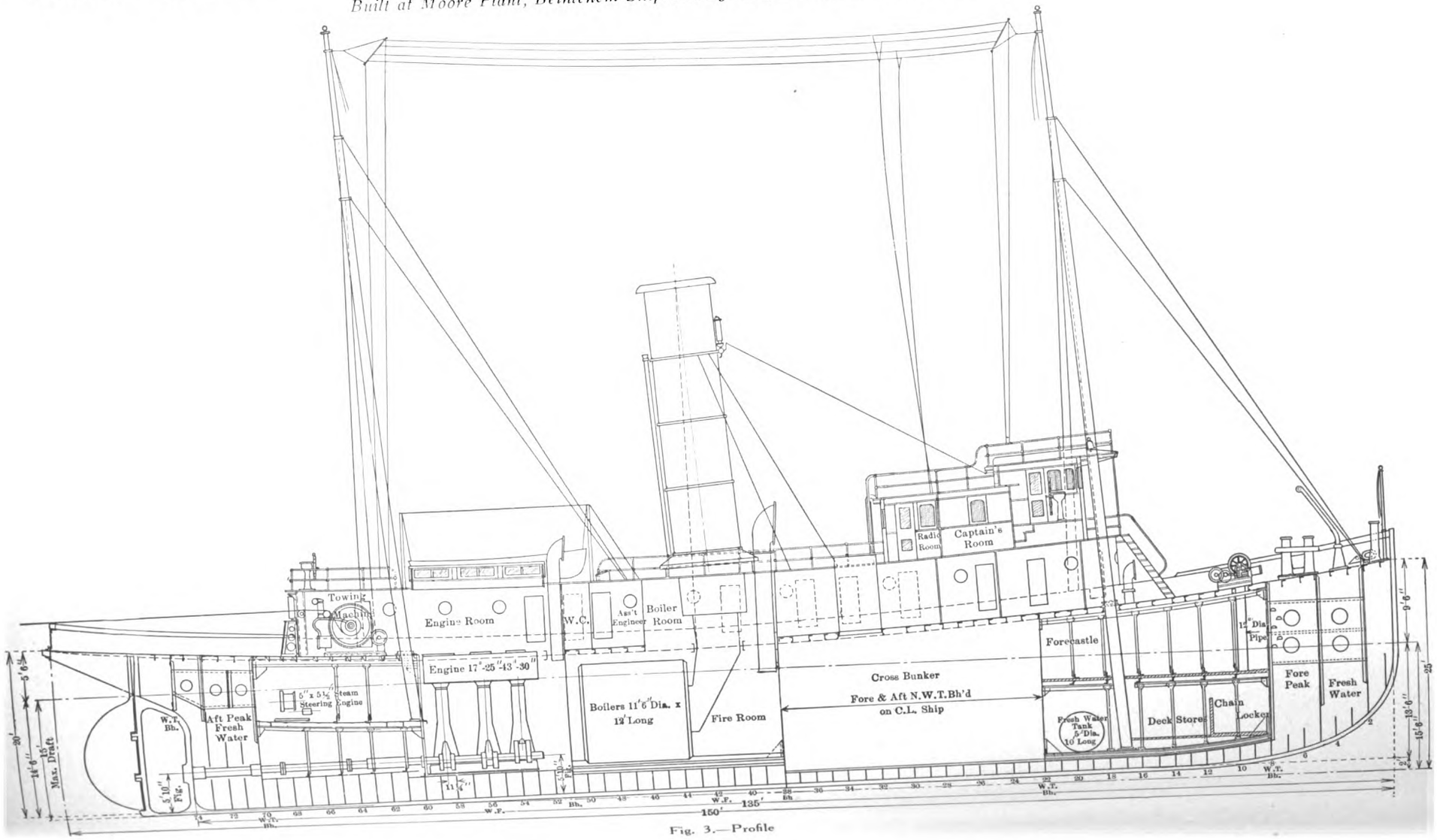


Fig. 3.—Profile

Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Generated on 2024-09-12 08:03 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

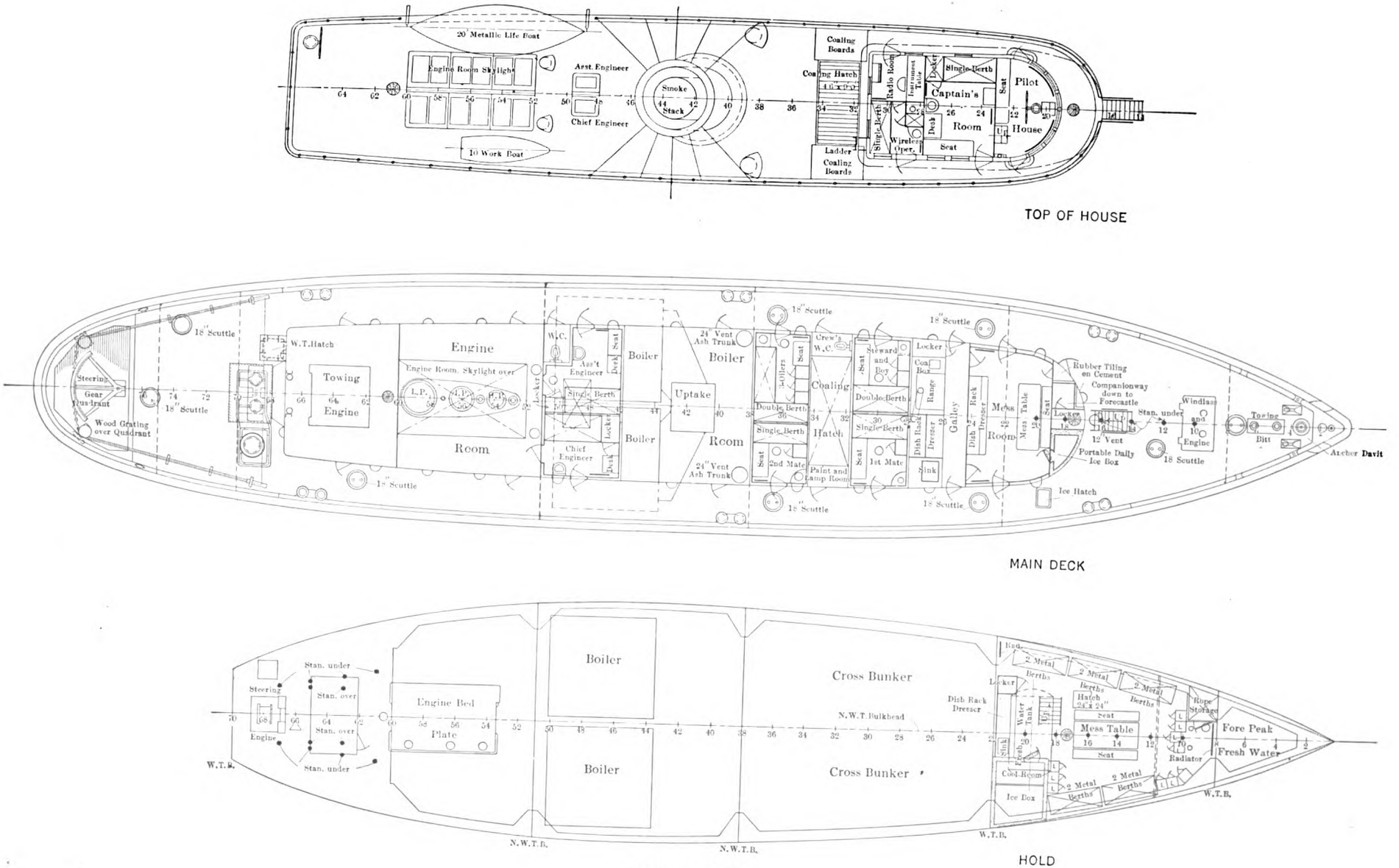


Fig. 4.—Deck Plans

Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

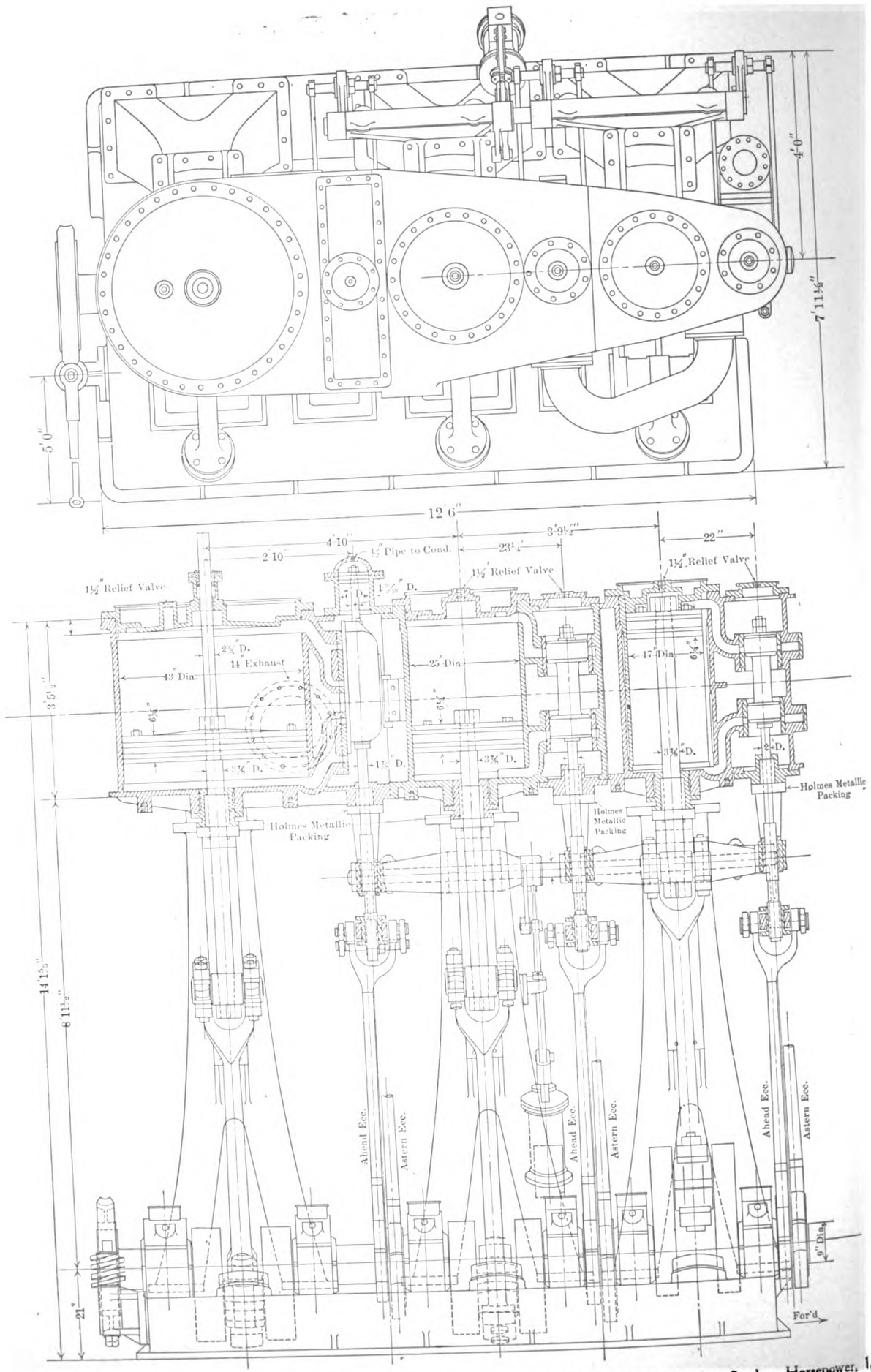


Fig. 5.—Main Engine of 150-Foot Tug; Cylinders, 17, 25 and 43 Inches Diameter by 30 Inches Stroke; Horsepower, 1,000

Generated on 2024-09-12 07:51 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

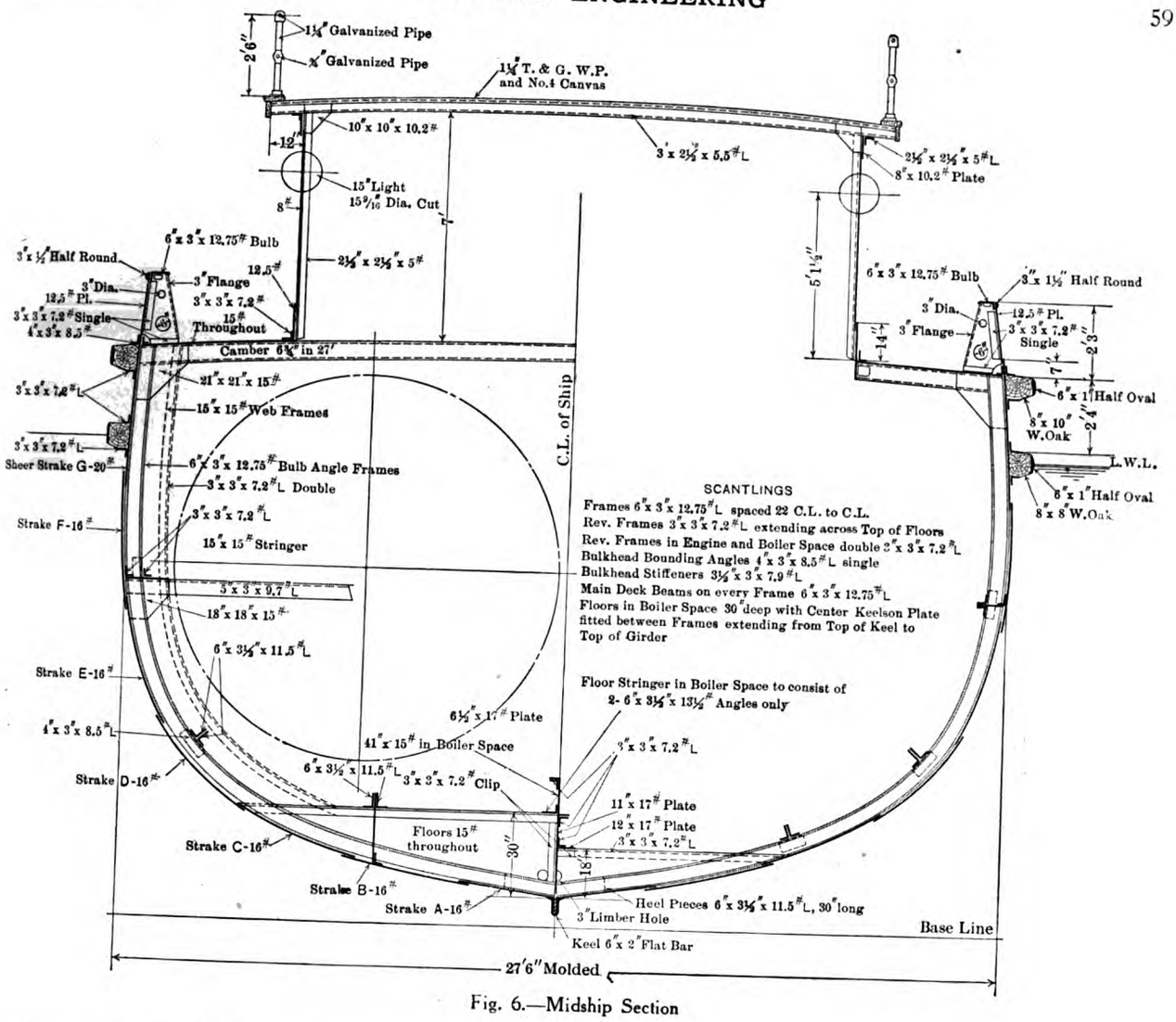

1¼" Galvanized Pipe
¾" Galvanized Pipe
1¼" T. & G. W.P. and No.4 Canvas
10" x 10" x 10.2#
3" x 2½" x 5.5#L
2½" x 2½" x 5#L
8" x 10.2# Plate
15" Light
15 9/16" Dia. Cut
6" x 3" x 12.75# Bulb
3" x ½" Half Round
3" Dia.
12.5# Pl.
3" x 3" x 7.2# Single
4" x 3" x 8.5#
3" Flange
3" x 3" x 7.2#
15# Throughout
12.5#
2½" x 2½" x 5#
Camber 6¾" in 27'
21" x 21" x 15#
15" x 15# Web Frames
6" x 3" x 12.75# Bulb Angle Frames
3" x 3" x 7.2#L Double
3" x 3" x 7.2#L
15" x 15# Stringer
5" x 3" x 9.7#L
18" x 18" x 15#
6" x 3½" x 11.5#L
Sheer Strake G-20#
Strake F-16#
Strake E-16#
Strake D-16#
Strake C-16#
Strake B-16#
Strake A-16#
4" x 3" x 8.5#L
3" x 3" x 7.2#L
C.L. of Ship
SCANTLINGS
Frames 6" x 3" x 12.75#L spaced 22 C.L. to C.L.
Rev. Frames 3" x 3" x 7.2#L extending across Top of Floors
Rev. Frames in Engine and Boiler Space double 2" x 3" x 7.2#L
Bulkhead Bounding Angles 4" x 3" x 8.5#L single
Bulkhead Stiffeners 3½" x 3" x 7.9#L
Main Deck Beams on every Frame 6" x 3" x 12.75#L
Floors in Boiler Space 30" deep with Center Keelson Plate fitted between Frames extending from Top of Keel to Top of Girder
Floor Stringer in Boiler Space to consist of 2- 6" x 3½" x 13½# Angles only
6½" x 17# Plate
41" x 15# in Boiler Space
6" x 3½" x 11.5#L
3" x 3" x 7.2# Clip
Floors 15# throughout
30"
18"
11" x 17# Plate
12" x 17# Plate
3" x 3" x 7.2#L
Heel Pieces 6" x 3½" x 11.5#L, 30" long
3" Limber Hole
Keel 6" x 2" Flat Bar
Base Line
27'6" Molded
5'1½"
14"
6" x 3" x 12.75# Bulb
3" x 1½" Half Round
3" Dia.
3" Flange
12.5# Pl.
3" x 3" x 7.2# Single
6" x 1" Half Oval
8" x 10" W.Oak
L.W.L.
6" x 1" Half Oval
8" x 8" W.Oak

Fig. 6.—Midship Section

towing machines, in addition to the towing bit and capstan. The details of the construction of both hull and machinery of these vessels is shown in the drawings on the preceding pages.

Turning an Auxiliary Condenser Into an Oil Cooler

DURING a recent voyage from Portland, Ore., to New York the S. S. *Anoka*, of the American-Hawaiian Steamship Company, ran through very warm seas, the log book showing sea water temperatures of 88 degrees F. day after day. This condition made it very difficult to keep the lubricating oil cool, especially as the boat was equipped with only one cooler; in fact, the oil entered the cooler at 124 degrees and came out but one degree lower.

As a result of the use of this hot oil the bearings of her turbines grew hotter and hotter, and at last, when they reached 164 degrees, the chief engineer decided that something had to be done. Casting about for a remedy, he conceived the novel idea of transforming his auxiliary condenser into an oil cooler, and this he proceeded to do with the aid of such tools and piping as he had on board. The success of this plan was complete, as the oil temperature was immediately reduced to 103 degrees and the bearings kept in proper condition.

After reaching port, the condenser was boiled out with soda and kerosene (paraffin) and was ready for port operation.

The *Anoka* was built by the Peninsular Shipbuilding Company, Portland, Ore., and has covered 10,000 miles since leaving port. She is equipped with Westinghouse geared turbines. Arthur Sheridan is chief engineer.

Evolution of the Submarine Detector

The instrument known as the hydrophone, which successfully eliminated the submarine as a war factor within the past year, was a development of American brains and research. The detector is based on the principle of sound wave transmission through the water and depends for its direction-getting qualities on the peculiar and heretofore little understood faculty of the human ear to detect the direction of sound by the shifting of sound from one ear to the other.

The apparatus variously described as the detector or listening device was first designed to be hung overboard amidships below the waterline, while the observer was stationed on deck. Later the instrument was fastened to the hull of the vessel and the observer was stationed within the hold, connections leading through the side of the ship. For heavy war conditions a towing device or propeller was invented which dragged the listener through the water astern, where it would not be affected by the noise from the engines of the ship from which it was being worked.

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

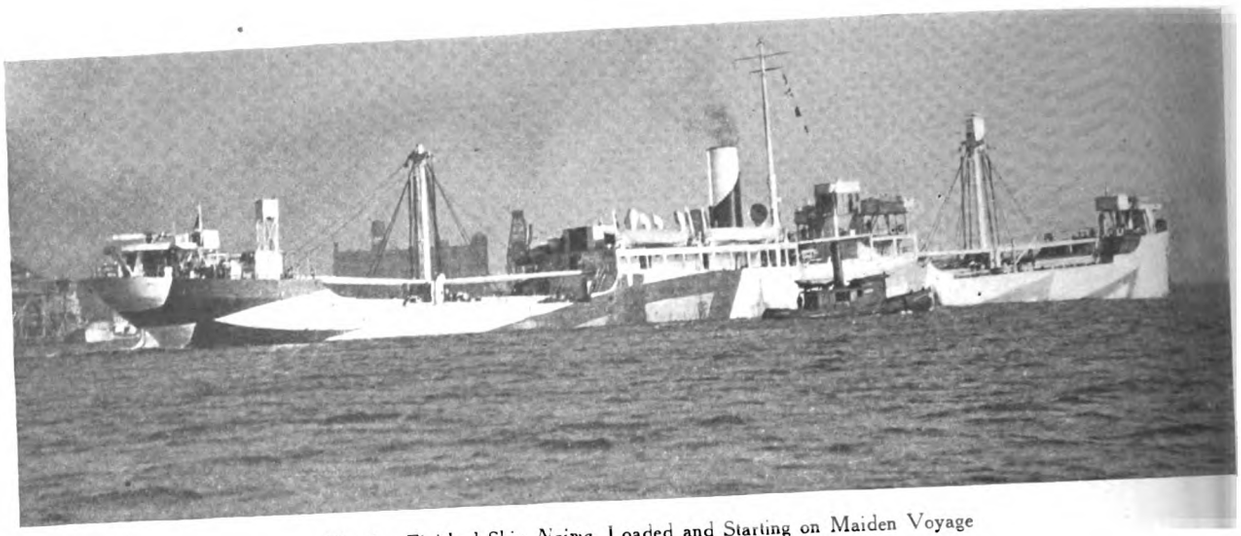


Fig. 1.—Finished Ship *Naiwa*, Loaded and Starting on Maiden Voyage

A Modern Steel Freight Steamship*

Factors Determining Size of Vessel and Type of Propelling Machinery—Details of 8,800 Deadweight Ton, Turbine-Driven Ship

BY D. D. THOMAS†

FOR ships trading between American and European ports, or between other ports, when the one-way voyage is between twelve to twenty days, the sizes of vessels will vary from 5,000 to 12,000 tons deadweight capacity, and the speed to be maintained under ordinary conditions of sea and weather varying from about 9½ knots for the 5,000-ton ship to about 12 knots for the 12,000-ton ship.

The question of the most desirable size and type of ship has recently claimed a great deal of attention from the people who operate ships, and, judging from the papers and articles appearing at the present time regarding the scientific designing of ships, it is clear that the best methods have not always been followed when new construction has been under consideration.

This has been due, in a great measure, to a lack of understanding between the shipowner and the builder. There should be a closer co-operation, as the owner has at his disposal valuable data regarding the operating cost of his ships.

Unfortunately, these data are often not available for the builder who, when asked to bid on new work, may, with luck, hit on a design as good as the owner's best ship.

* From a lecture delivered in the J. E. Aldred series of lectures at Johns Hopkins University, Baltimore, Md.

† Chief engineer, The Baltimore Dry Docks & Shipbuilding Company, Baltimore, Md.

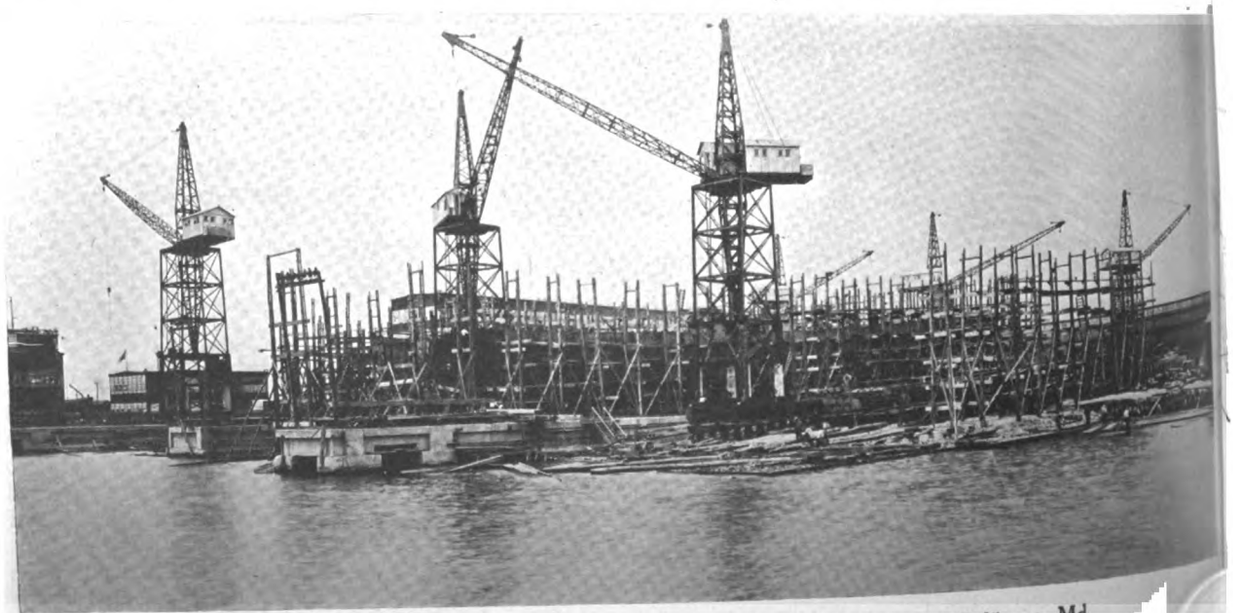


Fig. 2.—Yard at South Plant, Baltimore Dry Docks & Shipbuilding Company, Baltimore, Md.

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

8′6″ Parallel at C.L.
9′6½″ Parallel at C.L.
Columns as per Profile
Line Strake .52″ to .42″
3½″ x 3½″ x .52″ to .48″
Top Bars to be Double Continuous
6″ x 6″ x .40 Dbl.
6″ x 6″ x .40″ Single by Intermediate
Center Girder .52″ to .42″ in Boiler Space .60″
5″ x 5″ x .56″ to .52″
Keel .47″ x .96″ to .68″
ıd on Flat of Floor

) the matter of final
entific knowledge of
ed with the practical
the most suitable de-

ıery and the arrange-
hatches is very im-
hip is loaded and un-
nomical operation of

ınd the type of aux-
carefully, as fuel is

Generated on 2024-09-12 08:17 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

A

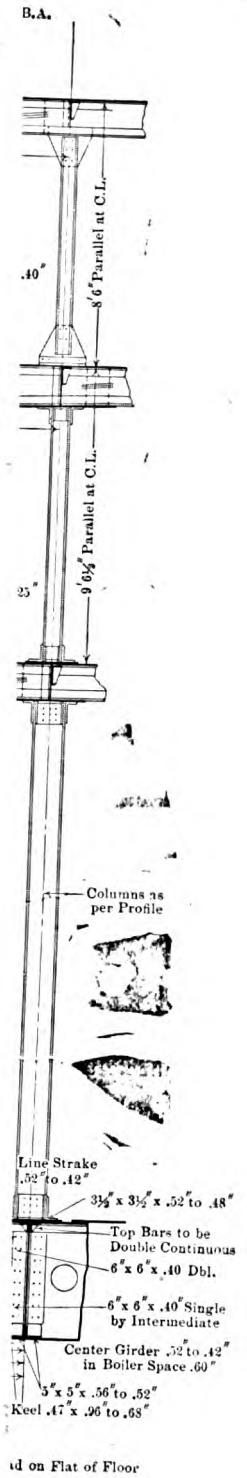
FOR ships tradi
ports, or betw
voyage is between
vessels will vary fi
capacity, and the sp
conditions of sea a
knots for the 5,000
12,000-ton ship.

The question of th
has recently claimed

* From a lecture delive
Johns Hopkins University
† Chief engineer, The Ba
Baltimore, Md.

Fig. 2

Generated on 2024-09-12 08:02 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from
UNIVERSITY OF ILLINOIS AT
URBANA-CHAMPAIGN


B.A.
.40"
8'6" Parallel at C.L.
9'6½" Parallel at C.L.
25"
Columns as per Profile
Line Strake .52" to .42"
3½" x 3½" x .52" to .48"
Top Bars to be Double Continuous
6" x 6" x .40 Dbl.
6" x 6" x .40" Single by Intermediate
Center Girder .52" to .42" in Boiler Space .60"
5" x 5" x .56" to .52"
Keel .47" x .96" to .68"

ıd on Flat of Floor

the matter of final
entific knowledge of
ed with the practical
the most suitable de-

ery and the arrange-
hatches is very im-
hip is loaded and un-
ıomical operation of

ınd the type of aux-
efully, as fuel is

Generated on 2024-09-12 08:05 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

A

FOR ships tradi
ports, or betw
voyage is between
vessels will vary f
capacity, and the sp
conditions of sea a
knots for the 5,000
12,000-ton ship.

The question of th
has recently claimed

* From a lecture delive
Johns Hopkins University
† Chief engineer, The Ba
Baltimore, Md.

Fi

Generated on 2024-09-12 08:02 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from
UNIVERSITY OF ILLINOIS AT
URBANA-CHAMPAIGN

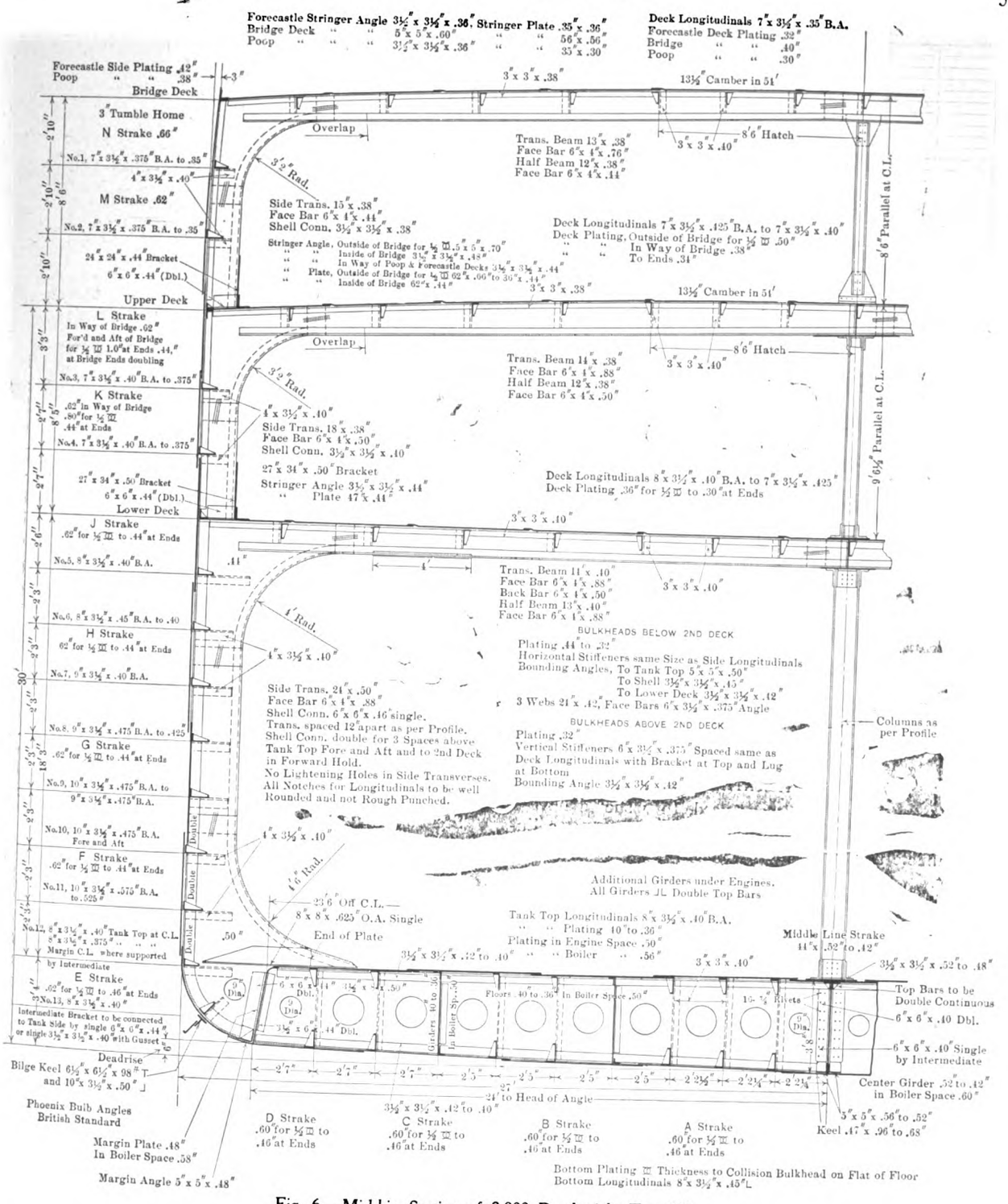

Forecastle Stringer Angle 3½"x 3½"x .36" Stringer Plate .35"x .36"
Bridge Deck " " 5"x 5"x .60" " " 56"x .56"
Poop " " " 3½"x 3½"x .36" " " " 35"x .30"
Deck Longitudinals 7"x 3½"x .35" B.A.
Forecastle Deck Plating .32"
Bridge " " .40"
Poop " " .30"
Forecastle Side Plating .42"
Poop " " .38"
Bridge Deck
3" Tumble Home
N Strake .66"
No.1, 7"x 3½"x .375" B.A. to .35"
M Strake .62"
No.2, 7"x 3½"x .375" B.A. to .35"
24"x 24"x .44" Bracket
6"x 6"x .44" (Dbl.)
Upper Deck
L Strake
In Way of Bridge .62"
For'd and Aft of Bridge
for ½ ⅀ 1.0" at Ends .44"
at Bridge Ends doubling
No.3, 7"x 3½"x .40" B.A. to .375"
K Strake
.62" in Way of Bridge
.80" for ½ ⅀
.44" at Ends
No.4, 7"x 3½"x .40" B.A. to .375"
27"x 34"x .50" Bracket
6"x 6"x .44" (Dbl.)
Lower Deck
J Strake
.62" for ½ ⅀ to .44" at Ends
No.5, 8"x 3½"x .40" B.A.
No.6, 8"x 3½"x .45" B.A. to .40
H Strake
.62" for ½ ⅀ to .44" at Ends
No.7, 9"x 3½"x .40" B.A.
No.8, 9"x 3½"x .475" B.A. to .425"
G Strake
.62" for ½ ⅀ to .44" at Ends
No.9, 10"x 3½"x .475" B.A. to
9"x 3½"x .475" B.A.
No.10, 10"x 3½"x .475" B.A.
Fore and Aft
F Strake
.62" for ½ ⅀ to .44" at Ends
No.11, 10"x 3½"x .575" B.A.
to .525"
No.12, 8"x 3½"x .40" Tank Top at C.L.
8"x 3½"x .375" " " "
Margin C.L. where supported
by Intermediate
E Strake
.62" for ½ ⅀ to .46" at Ends
No.13, 8"x 3½"x .40"
Intermediate Bracket to be connected
to Tank Side by single 6"x 6"x .44"
or single 3½"x 3½"x .40" with Gusset
Deadrise
Bilge Keel 6½"x 6½"x 98" T
and 10"x 3½"x .50" L
Phoenix Bulb Angles
British Standard
Margin Plate .48"
In Boiler Space .58"
Margin Angle 5"x 5"x .48"
3"x 3"x .38"
13½" Camber in 51'
Overlap
3'2" Rad.
Trans. Beam 13"x .38"
Face Bar 6"x 4"x .76"
Half Beam 12"x .38"
Face Bar 6"x 4"x .44"
3"x 3"x .40"
8'6" Hatch
Side Trans. 15"x .38"
Face Bar 6"x 4"x .44"
Shell Conn. 3½"x 3½"x .38"
Stringer Angle, Outside of Bridge for ½ ⅀ 5"x 5"x .70"
" " Inside of Bridge 3½"x 3½"x .48"
" " In Way of Poop & Forecastle Decks 3½"x 3½"x .44"
" Plate, Outside of Bridge for ½ ⅀ 62"x .66" to 36"x .44"
" " Inside of Bridge 62"x .44"
Deck Longitudinals 7"x 3½"x .425" B.A. to 7"x 3½"x .40"
Deck Plating, Outside of Bridge for ½ ⅀ .50"
" " In Way of Bridge .38"
" " To Ends .34"
8'6" Parallel at C.L.
Trans. Beam 14"x .38"
Face Bar 6"x 4"x .88"
Half Beam 12"x .38"
Face Bar 6"x 4"x .50"
4'2½" Rad.
4"x 3½"x .40"
Side Trans. 18"x .38"
Face Bar 6"x 4"x .50"
Shell Conn. 3½"x 3½"x .40"
27"x 34"x .50" Bracket
Stringer Angle 3½"x 3½"x .44"
" Plate 47"x .44"
Deck Longitudinals 8"x 3½"x .40" B.A. to 7"x 3½"x .425"
Deck Plating .36" for ½ ⅀ to .30" at Ends
9'6½" Parallel at C.L.
Trans. Beam 11'x .40"
Face Bar 6"x 4"x .88"
Back Bar 6"x 4"x .50"
Half Beam 13"x .40"
Face Bar 6"x 4"x .88"
4' Rad.
4"x 3½"x .40"
BULKHEADS BELOW 2ND DECK
Plating .44" to .32"
Horizontal Stiffeners same Size as Side Longitudinals
Bounding Angles, To Tank Top 5"x 5"x .50"
To Shell 3½"x 3½"x .45"
To Lower Deck 3½"x 3½"x .42"
3 Webs 21"x .42", Face Bars 6"x 3½"x .375" Angle
BULKHEADS ABOVE 2ND DECK
Plating .32"
Vertical Stiffeners 6"x 3½"x .375" Spaced same as
Deck Longitudinals with Bracket at Top and Lug
at Bottom
Bounding Angle 3½"x 3½"x .42"
Columns as
per Profile
Side Trans. 21"x .50"
Face Bar 6"x 4"x .88"
Shell Conn. 6"x 6"x .46" single.
Trans. spaced 12' apart as per Profile.
Shell Conn. double for 3 Spaces above
Tank Top Fore and Aft and to 2nd Deck
in Forward Hold.
No Lightening Holes in Side Transverses.
All Notches for Longitudinals to be well
Rounded and not Rough Punched.
4'6" Rad.
Additional Girders under Engines.
All Girders ⅃⅂ Double Top Bars
23'6" Off C.L.
8"x 8"x .625" O.A. Single
End of Plate
Tank Top Longitudinals 8"x 3½"x .40" B.A.
" " Plating .40" to .36"
Plating in Engine Space .50"
" " " Boiler " .56"
Middle Line Strake
44"x .52" to .42"
3½"x 3½"x .52" to .48"
Top Bars to be
Double Continuous
6"x 6"x .40 Dbl.
6"x 6"x .40" Single
by Intermediate
Center Girder .52" to .42"
in Boiler Space .60"
Floors .40" to .36" In Boiler Space .50"
Girders 40 to 36 In Boiler Sp. .50
15-⅞" Rivets
2'7" 2'7" 2'7" 2'5" 2'5" 2'5" 2'5" 2'2½" 2'2¼" 2'2¼"
24' to Head of Angle
5"x 5"x .56" to .52"
Keel .47"x .96" to .68"
D Strake
.60" for ½ ⅀ to
.46" at Ends
C Strake
.60" for ½ ⅀ to
.46" at Ends
B Strake
.60" for ½ ⅀ to
.46" at Ends
A Strake
.60" for ½ ⅀ to
.46" at Ends
Bottom Plating ⅀ Thickness to Collision Bulkhead on Flat of Floor
Bottom Longitudinals 8"x 3½"x .45" L

Fig. 6.—Midship Section of 8,800 Deadweight Ton Ship

but this is by no means certain. Given full information, it is possible for the shipbuilder to produce a design at least equal to and probably better than the owner's best previous ship. The final efficiency of a ship depends upon the net income derived from freights in relation to the total cost of the ship.

A ship's earning capacity depends on the amount of deadweight carried and the cubic space for freight in relation to the total displacement. Shipbuilders have usually been content to fulfill the specified conditions of deadweight and speed on as cheap a ship as could be produced, and the owners have often bought the cheapest they could without going fully into the matter of final economical operating cost. The scientific knowledge of the expert in design must be associated with the practical experience of the shipowner before the most suitable design can be decided upon.

The type of cargo-handling machinery and the arrangement of this in relation to the cargo hatches is very important, for the speed with which a ship is loaded and unloaded has much to do with the economical operation of the ship.

The type of propelling machinery and the type of auxiliaries should be considered very carefully, as fuel is

Generated on 2024-09-12 09:00 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

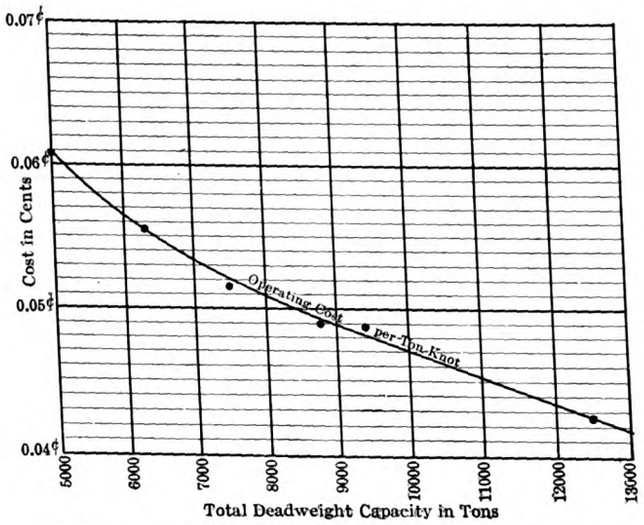


Fig. 7.—Curve Showing Relative Operating Costs of Different Size Ships

Fig. 9.—Vertical Keel in Place

the principal operating cost. For the type of freight ship we have under consideration, the following types of propelling machinery are most desirable:

Steam reciprocating engines; steam turbines with reduction gears; oil engines of the Diesel or semi-Diesel type; boilers of the Scotch or straight large tube type of watertube boilers, using either oil or coal as fuel.

Other things to be considered are: The type and method of driving the engine-room auxiliaries, also winches, steering gear, etc.; the steam pressure to be used and the amount of superheat, if any; type of condensing apparatus; type of draft for boilers, whether natural or forced.

Steam Reciprocating Engines

If reciprocating engines are used, they should have a fairly large ratio of low-pressure to high-pressure cylinder to enable the expansion of steam to be properly carried out.

Cylinder clearance should be reduced to the lowest practical limits. To obtain this, the ports, particularly for the high-pressure and intermediate-pressure cylinders, should be straight and short, using offset valve stems if necessary to shorten the ports. Both sides of pistons, bottom of cylinder covers and cylinder bottoms should be machined so the end clearance can be kept to the minimum, say ⅜-inch top and ½-inch bottom for engines from 1,800 to 3,500 indicated horsepower.

The high-pressure and intermediate-pressure valves should be of the piston type, with a double-ported slide valve for the low-pressure up to 3,000 indicated horsepower. Above this power, the low-pressure valve should also be of the piston type in order to keep down the size of the valve gear.

The use of steam jacketing does not appear to be justified, but special attention should be paid to insulating the cylinders and all steam radiating surfaces.

Triple-expansion engines using steam from boilers designed for 200 pounds working pressure and a cylinder ratio giving about twelve expansions should develop an indicated horsepower on about 13½ pounds of water.

Steam Turbines

Steam turbines with reduction gearing as built by several of the large turbine builders will give a shaft horsepower on about 12 pounds of water. The turbine, however, requires more steam for its auxiliaries, and when all of this has been considered the turbine would appear to require about 15 percent less steam than the reciprocating engine. This, of course, means the same saving in fuel.

Reliability in service, repairs, weight and available supply of trained men for operating are points to be considered when deciding on the best type of propelling engines.

There is no doubt but that both types will be used for

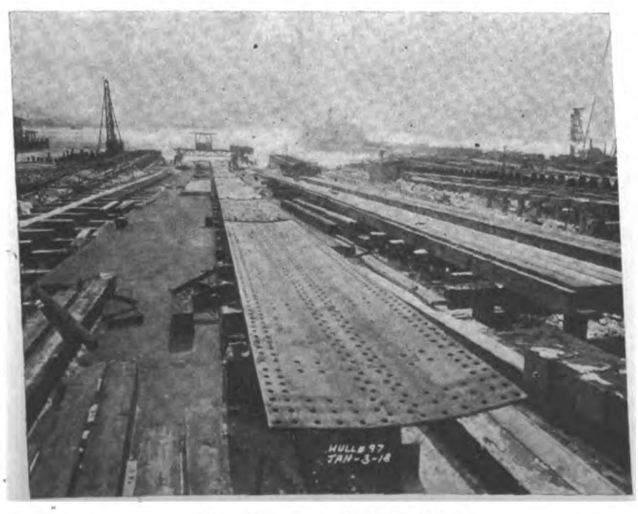


Fig. 8.—Flat Keel in Place

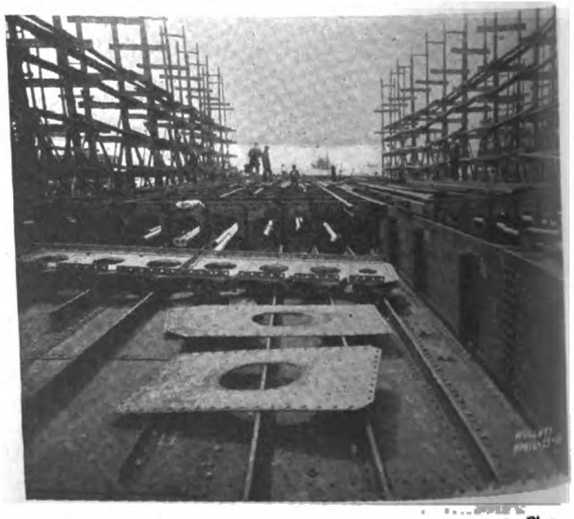


Fig. 10.—Midship Floors and Drainage Piping in Place

Generated on 2024-09-12 07:53 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

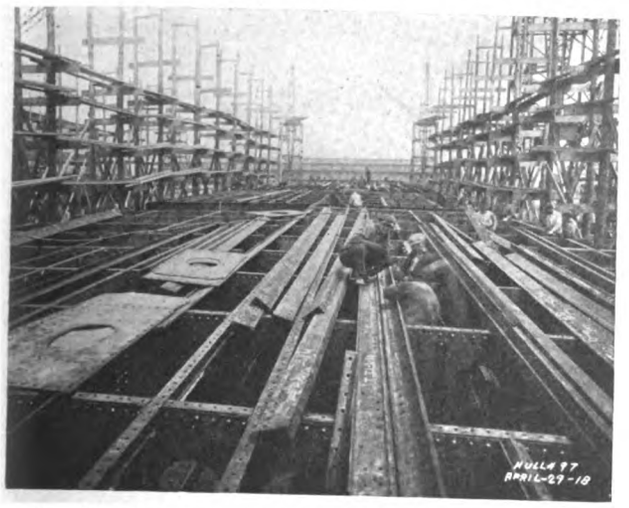


Fig. 11.—Tank Top Longitudinals and Floors in Place

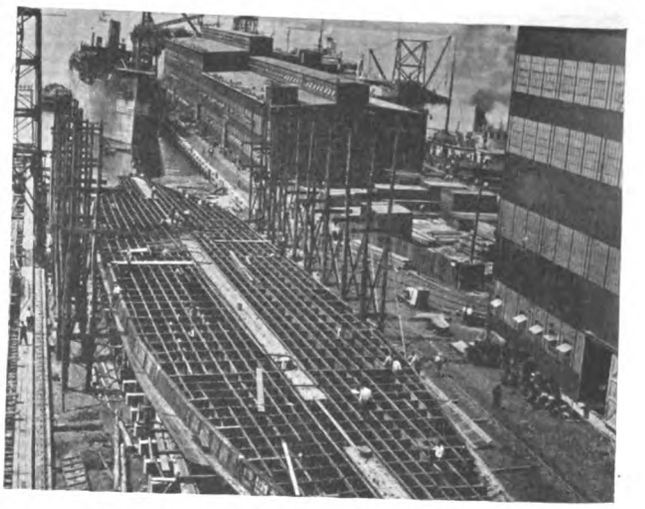


Fig. 13.—Inner Bottom Framing in Place

many years to come. For the smallest ships, with engines of 1,800 horsepower or less, the reciprocating engine would appear to be better on account of its simpler construction and simpler auxiliaries and cheaper grade of engineers employed on this type of ship. Above this power, and particularly above 3,000 horsepower, the preference would appear to be for the turbo reduction gears. On ships requiring this size engine, the engineering forces are better paid, and consequently better men are obtained to operate this more refined type of machinery.

The turbine is much more adaptable to the use of superheat and high vacuum, and these two items have a large bearing on the question of economy. A few years ago it was difficult to obtain over 27½ inches of vacuum, but today 29 inches is about as easily obtained by the use of steam air ejectors working in conjunction with a condensate pump.

With reduction gears, the lubricating system is of utmost importance, as the success of the gears is dependent upon the efficient operation of the lubricating system. With an efficient lubricating system there will be practically no overhauling or repairing required with the reduction gear sets.

BOILERS

In considering boilers for steam installations, the first question is the kind of fuel. If oil is to be used, and the horsepower is above 2,500 and turbo reduction gears and superheat are to be used, the watertube boiler would appear to have the advantage on account of the cheaper first cost and the lighter weight and less space required.

With the oil-burning installation there is little dirt and

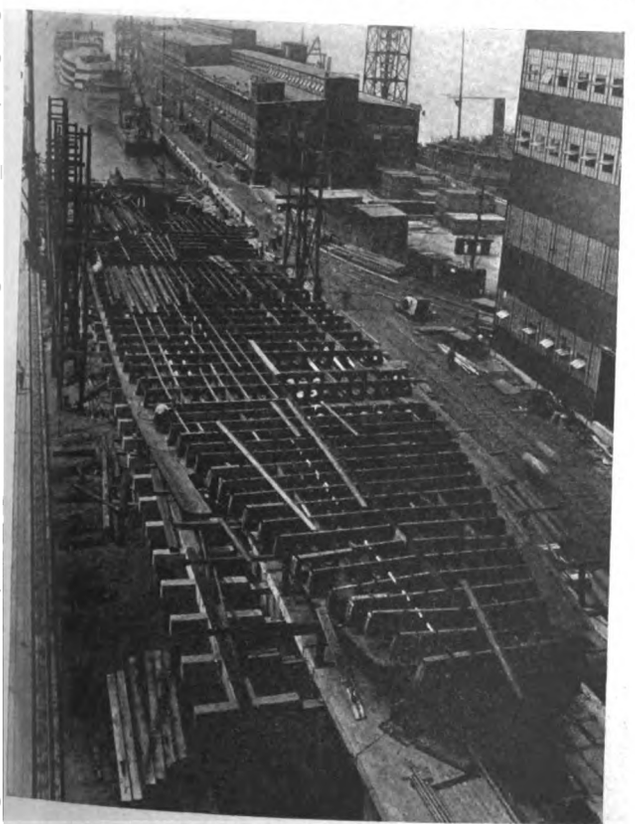


Fig. 12.—View Showing All Floors in Place

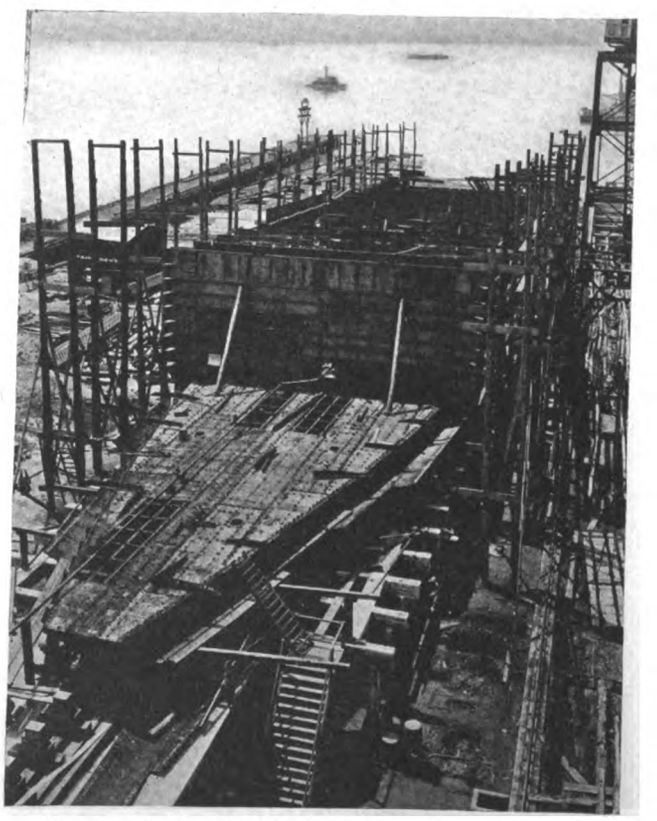


Fig. 14.—Midship Bulkheads and Transverses in Place

Generated on 2024-09-12 08:00 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

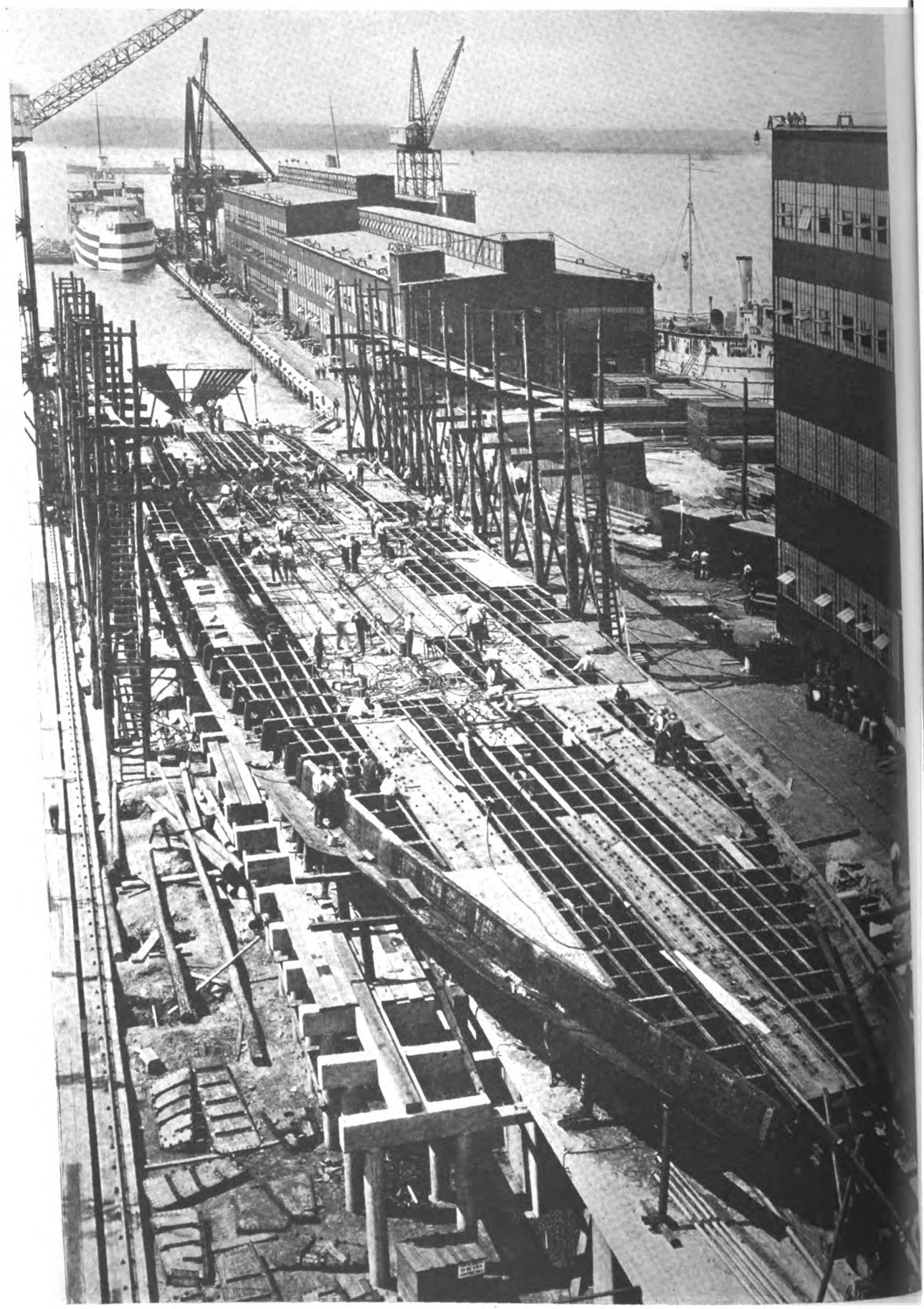


Fig. 15.—View Looking Aft, Showing Aft Peak Transverses and Tank Top Being Put in Place

Generated on 2024-09-12 08:03 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

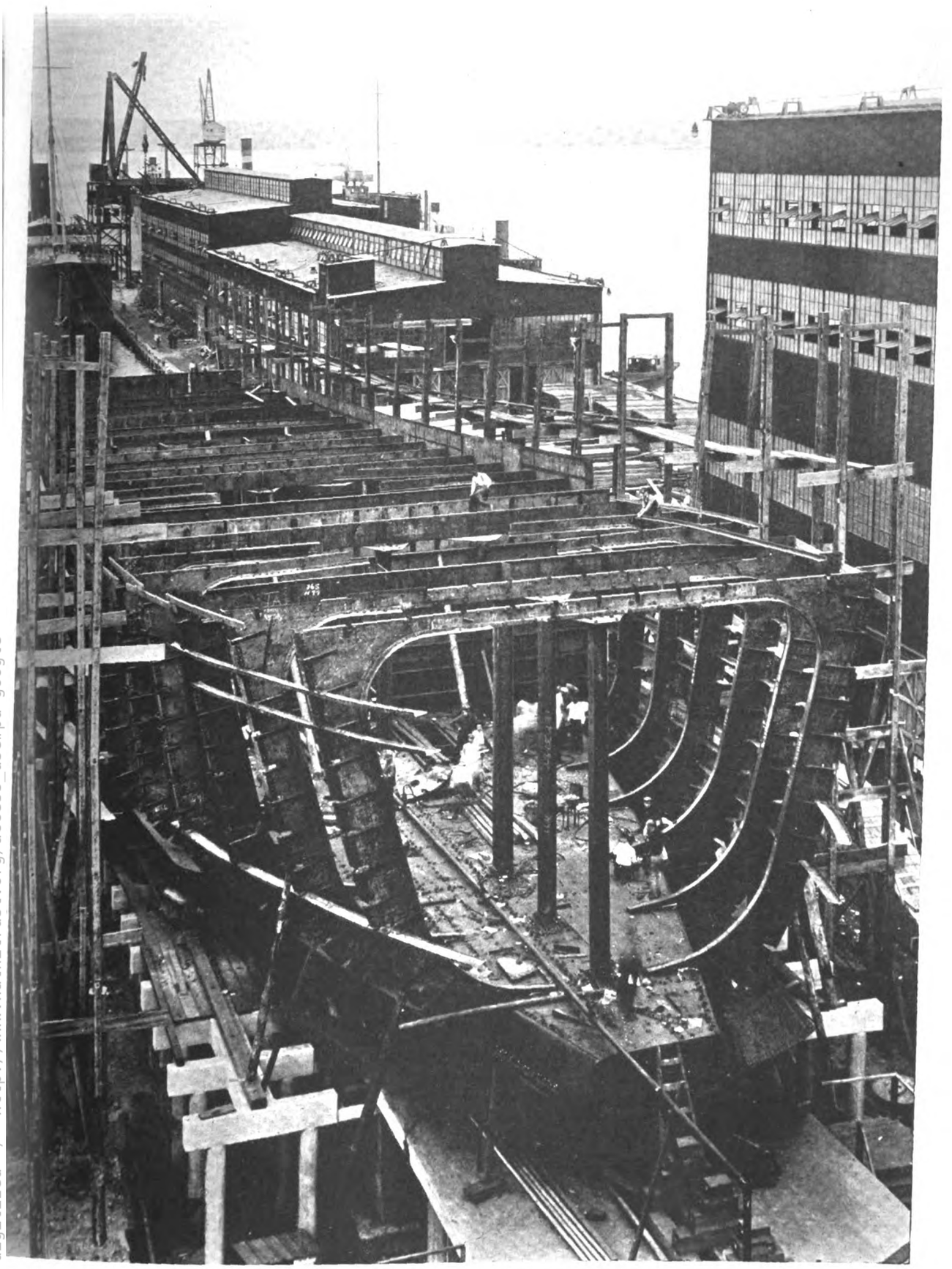


Fig. 16.—View Looking Aft, Showing Forward Transverses in Place

Generated on 2024-09-12 08:06 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

no ashes, and for this reason oil-burning watertube boilers are not subjected to the same deterioration as the coal-burning watertube boiler.

For coal burning with forced draft and reciprocating engines the Scotch type would appear to have the advantage because the deterioration of the brick work in the watertube boiler would be done away with, and also the larger steam space required for the reciprocating engine would be obtained with the Scotch boiler.

Superheat should be used on both types of boilers, except in low-powered installations. For the reciprocating installation a total temperature of 450 degrees F., and for the turbine 500 degrees F., would appear to give satisfactory results. Higher temperatures than these would require special material for piping, valves and fittings and present difficulty in effecting repairs in foreign ports. Ordinary steel and good bronze will take care of 500 degrees F. without trouble.

The advantage to be gained in economical operation by use of superheat has been neglected in the past, but is now generally recognized, as an almost universal use of superheat may be looked for in the future.

Diesel or Other Oil Engines

The particular field for Diesel or other oil engines is for small- or medium-powered ships designed to operate on long voyages and to places where coal for fuel would be hard to obtain. For horsepowers from 1,500 to 2,500, very reliable and economical installations can be obtained. The oil-engine installations will require about one-half the fuel that the best steam installations do. Less attendants will be required and the weight will be slightly less.

For the above power a four-cycle engine is recommended because it is simpler and less liable to cause trouble in getting rid of the heat. With an installation of this kind, a donkey boiler should be supplied capable of being operated by the engine exhaust gases at sea and by oil fuel in port. The boiler should be large enough to operate the steering engine, the sanitary and bilge pumps, and furnish steam for heating and cooking. A small Diesel engine-driven electric generator should be installed for supplying the current to the electric cargo winches for port use.

The Diesel engine will have special advantages when trading in Gulf ports or on the Pacific coast, or similar places where oil is more readily obtainable than coal. While the Diesel-engined ship requires a smaller engine room force, it also requires a more intelligent and higher paid force; therefore there would be but little advantage for the Diesel engine in saving wages in the engine room force.

The principal objection to Diesel engines in the past has been their unreliability in operation and the excessive repair bills, particularly with the two-cycle engines.

Comparison of Types of Motive Power

In summing up, it will be noted that the largest items of operating expense are fuel and the pay of the engine room force. Hence, successful designers of machinery will have as their chief aim the securing of economy in operation and the reduction of the operating force. The first cost has too often been the deciding factor. The saving in operating expense of a few years will make up the increased first cost of a more economical design. Where a number of ships are being built from one design, the importance of perfection in the design is greatly increased, for a defect or advantage are both multiplied many times.

The comparison from the operator's point of view is often based on cost per ton-knot. Basing this ton-knot cost on interest, depreciation, etc., of the first cost of the ship, and in the cost of crew's wages, food, cost of fuel, oil and other consumable stores, we can show that the cost per ton-knot of a 12,000 deadweight ton ship of 12 knots is about 30 percent less than the cost per ton-knot of a 5,000-ton deadweight ship of 9½ knots. This is clearly shown in the curve shown in Fig. 7.

This comparison, of course, might be extended to much larger ships, but the size of general cargo freight ships is limited on account of other conditions, such as port facilities and the depth of water at different points. The two sizes given above practically cover the extremes in sizes of steel ships which have been ordered by the Emergency Fleet Corporation in their plan to overcome the destruction of shipping by the German submarines.

In looking over a list recently published giving average size of English freight ships, we find the averages for five of the largest operators are:

Operator	Number of Ships	Gross Tons	Average Size
Furness Line	155	699,001	4,510
Ellerman Lines, Ltd.	108	607,870	5,628
British India	125	588,878	4,711
Alfred Holt & Company	74	509,744	6,888
Peninsular & Oriental Company.	47	409,086	8,704

To compete with these ships it seems desirable for the future, except for special trade, that we construct no ships of less than 8,800 deadweight tons capacity. This would equal about 6,200 gross tons and would be larger than the average of the ships just mentioned.

The ship which will be used as an example is an 8,800 deadweight ton, 10½-knot ship, eight of which are being built for the Emergency Fleet Corporation by The Baltimore Dry Docks & Ship Building Company, Baltimore, Md. The ship has a light displacement of 3,433 tons; the load displacement is 12,260 tons, making the deadweight capacity 8,827 tons. This is shown in the deadweight scale and capacity plan, Fig. 4.

The register tonnages of the ship are as follows:

American	gross tonnage	6,240.66
"	net tonnage	4,704.00
"	under deck tonnage	5,331.74
Panama	gross tonnage	6,727.18
"	net tonnage	4,843.09
"	under deck tonnage	5,699.85

General Description of the 8,800 Deadweight Ton Ship

Length overall	423 feet 9 inches
Length between perpendiculars	10 feet 5½ inches
Beam, molded	54 feet 0 inch
Depth, molded	30 feet 0 inch
Draft, designed load	24 feet 1 inch
Cubic capacity for grain	422,358 cubic feet
Deadweight (24 feet 1 inch draft)	8,827 tons
Fuel oil capacity	1,019 tons
Fresh water (boiler feed)	157 tons
Fresh water (drinking)	8,800 gallons
Speed, loaded	10½ knots
Shaft horsepower	2,500
Revolutions per minute	90

The vessel will be a steel single-screw cargo steamer of the poop, bridge and forecastle type, complete double bottom, built on the longitudinal system of construction. Machinery will be amidships. Oil will be carried in Nos. 1, 2 and 4 and 5 inner bottom tanks and in deep settling tank at forward end of machinery space. Boiler feed water will be carried in No. 3 inner bottom tanks under machinery space. There will be two masts with four steel booms on each and two derrick posts each with one steel boom.

The forward and after holds will each be divided

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

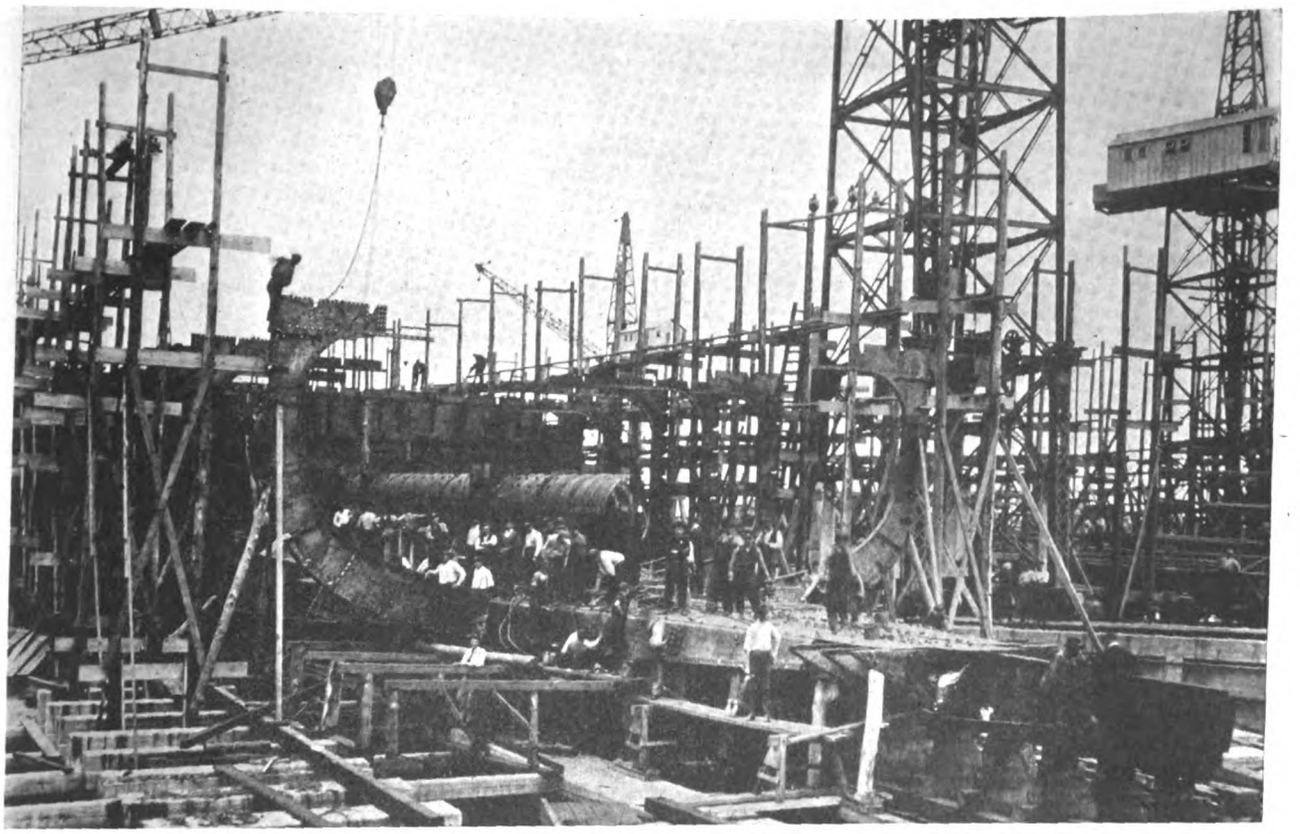


Fig. 17.—View Looking Forward, Showing Aft Transverses and Shaft Alley Being Put in Place

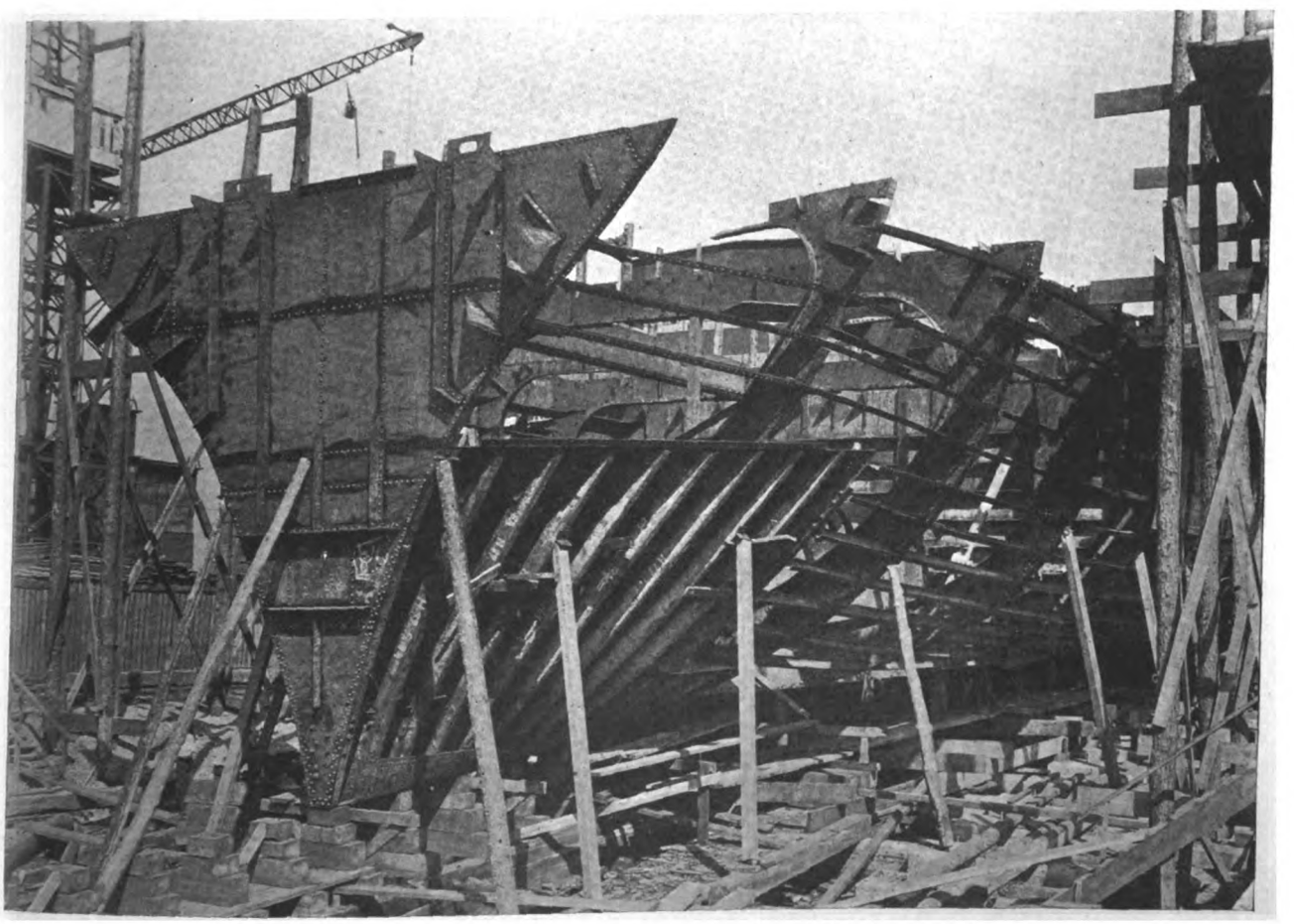


Fig. 18.—View Looking Forward, Showing Aft Peak Bulkhead and Side Longitudinals in Place

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

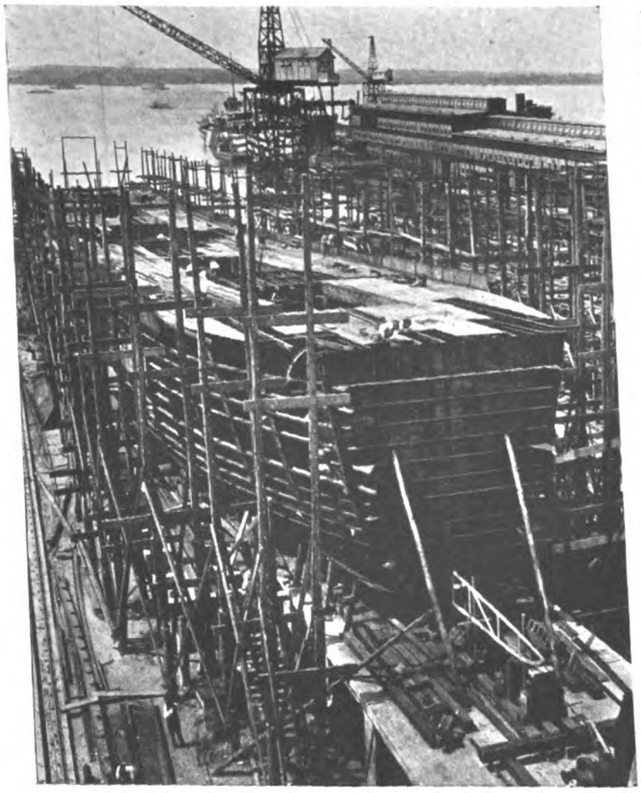


Fig. 19.—Fore Peak Bulkhead, Transverse Framing and Upper Deck in Place

two compartments by transverse watertight bulkheads. There will be four large and one small cargo hatches through the upper and second decks. Wide-spaced hold and 'tween deck pillars will be fitted, arranged so as not to interfere with the rapid stowage and discharge of cargo.

The general arrangement is shown in Fig. 3, profile and deck plans.

The propelling machinery will consist of one Curtis five-stage ahead turbine of 2,500 shaft horsepower and a two-stage backing turbine in the same casing, which will give about 60 percent of the ahead power. The turbine will be connected to the propeller shaft by a two-stage reduction gear. The turbine will exhaust into a surface condenser of 4,000 square feet cooling surface. To the condenser will be connected a 16-inch turbine-driven centrifugal circulating pump, a 3-inch turbine-driven condensate pump and two E-2 Radojet air pumps, the condensing outfit to be capable of maintaining a vacuum of 28½ inches when the main turbine is operating at full power. There will be four watertube boilers of the Heine type, having a total heating surface of 18,000 square feet and fitted for burning oil under natural draft.

The following auxiliaries will be furnished and connected in the usual manner for a vessel of this type:

One R. & L. screw steering engine with double 8-inch by 7-inch cylinders.
One double spur-geared anchor windlass with double 9-inch by 9-inch cylinders.
One capstan, double 6-inch by 8-inch cylinders.
Four winches, double 9-inch by 9-inch cylinders.
Six winches, 8¼-inch by 8-inch cylinders.
One auxiliary condenser of 950 square feet cooling surface, with attached combined air and circulating pump.
Two 10-kilowatt electric generating sets.
One 25-ton evaporator.
One feed water heater.
One 12-inch by 8-inch by 18-inch simplex main feed pump.
One 12-inch by 8-inch by 18-inch simplex auxiliary feed pump.
One 12-inch by 8½-inch by 12-inch duplex fire and donkey pump.
One 10-inch by 12-inch by 12-inch duplex ballast pump.
One 7½-inch by 6-inch by 10-inch duplex bilge pump.
One 6-inch by 6-inch by 6-inch duplex sanitary pump.
One 6-inch by 4-inch by 6-inch duplex fresh water pump.
One 5¾-inch by 3½-inch by 5-inch duplex evaporator feed pump.
Two 7½-inch by 7-inch by 10-inch duplex lubricating oil pumps.
One 7½-inch by 7-inch by 10-inch duplex oil cooler pump.
One 7½-inch by 6-inch by 10-inch duplex fuel oil transfer pump.
Two 5¼-inch by 3½-inch by 5-inch duplex fuel oil pumps.

Fig. 5 shows the launching plan, and the following data were taken at the time of launching:

Declivity of keel	⅝ inch per foot
Mean declivity of ways	11.2/16 inch per foot
Water over end ways	7 feet 3½ inches
Vessel ran her length from start	31 seconds
Mean velocity	13.25 feet per second
Length of sliding ways	343 feet
Width of sliding ways	2 feet 6 inches
Effective area of sliding ways	1,715 square feet
Draft forward	5 feet 2 inches
Draft aft	8 feet 6 inches
Mean draft	6 feet 10 inches
Density of water	35.602 cubic feet per ton
Launching displacement	3,010 tons
Mean weight per square foot on ways	1.75 tons
Pivoting pressure on fore poppets	850 tons

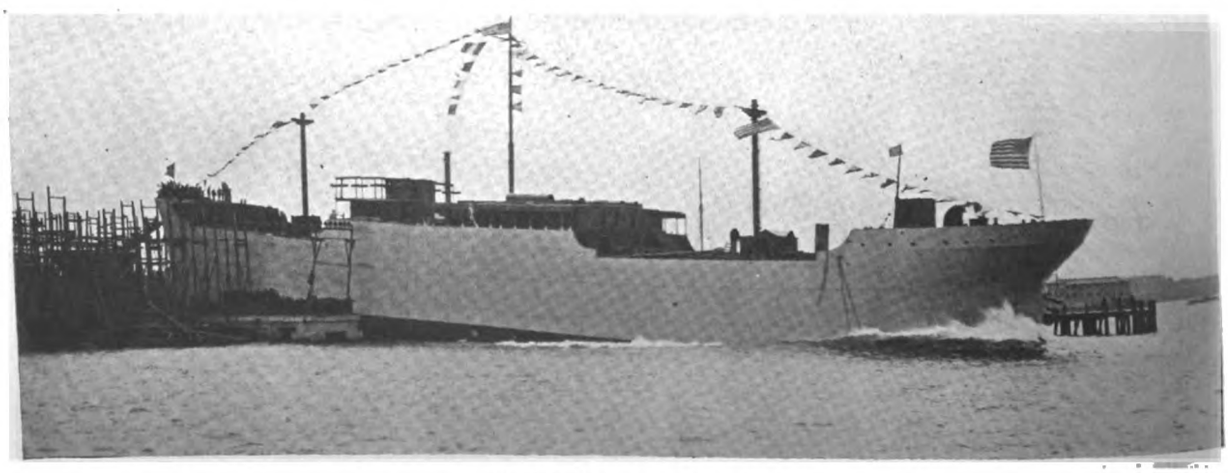


Fig. 20.—Launching, Stern View

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Congress and the Merchant Marine

Shipping Measures Before the Senate and House of Representatives—Little Headway Being Made Towards Shipping Policy

BY WALDON FAWCETT

WITH the committee on commerce of the United States Senate marking time during the dog days on the general proposition of the formulation of a policy in encouragement of the American merchant marine, the House of Representatives has established contact with the general subject via its committee on the merchant marine and fisheries. There is, however, a difference in procedure in the two branches of Congress that is interesting, if not significant. As has been explained in the August issue of MARINE ENGINEERING, the programme in the United States Senate calls for a general canvass of the shipping situation by the committee on commerce with the object of formulating and recommending to the Senate for approval comprehensive legislation designed to deal with such aspects of the subject as may seem to require Federal sanction or support.

In the House of Representatives, on the other hand, there has been disclosed during the past month a plan of procedure that is directly the opposite of that in the Senate. Instead of pondering the broad proposition and leaving individual bills to wait upon the determination of a national policy, the disposition in the House of Representatives' committee on the merchant marine is to consider, as a prospective law unto itself, each proposal that is put before it. Nor is there any lack of original, not to say unique, ideas on this subject, as is eloquently attested by the range of discussion in public hearings conducted by the House committee during the past few weeks.

> "Every element that goes to make up what is called American shipping should be governed and controlled by Americans; otherwise it is not American shipping. There is no reason in the world why American shipowners should have their ships classed, insured or anything else abroad. You cannot expect the people abroad to lie awake nights to help American shipping as against their own shipping. Therefore all elements—the underwriters, the shipowners, the shipbuilders and the ship operators—should look to American institutions for those things they need. That is fundamental—American interests are best served in American institutions."—COMMODORE E. P. BERTHOLF, U. S. C. G. (Retired).

SHIPPING MEASURES BEFORE CONGRESS OF DIVERSE CHARACTER

Without attempting to catalogue all the proposals with respect to shipbuilding and the merchant marine that have been placed before the merchant marine committee for scrutiny, it may be permissable to cite a few examples as indicative of the diversity of the suggestions advanced. For example, Congressman Greene of Massachusetts has introduced a bill (H. R. 5498) which lays down a complete formula for the sale, charter and operation of the merchant ships owned by the United States. Set over against that is the panacea of Congressman Walsh, who, in the bill designated officially as H. R. 4417, seeks the creation within the Government of an executive department to be known as the Department of Marine and Fisheries, to which would be transferred the United States Shipping Board, which would function as one cog in the new machine under the name "Bureau of Merchant Marine." Looking in yet another direction we find awaiting the attention of this committee on eligibility the bill of Representative Alexander (H. R. 3621) to establish load lines for vessels; and so the list of candidates might be considered almost indefinitely.

One of the first proposals to have consideration at the hands of members of the House committee on merchant marine was the bill making it unnecessary to secure permits from the United States Shipping Board for the construction of ships in American shipyards for foreign account. Various officials of the Shipping Board appeared before the committee to shed light on the attitude of the Governmental body, and there was some representation of the shipbuilders who favor freedom of action in the premises—notably by Harrison S. Robinson, who appeared as spokesman for the steel shipbuilding interests of California, Oregon and Washington.

After it had been pointed out that legislation of this class was really unnecessary in the face of President Wilson's advices giving the Shipping Board permission to authorize American shipbuilders to build for foreign account, the present attitude of the Shipping Board was revealed as one wherein no obstacle would be placed in the way of the negotiation of foreign contracts, but that there is a wish that shipbuilders who are in a position to undertake the construction of 10,000-ton ships would give preference to American contracts over foreign orders at an even price. The position of the Shipping Board was concretely stated as follows: "We might be handicapped if our yards filled up with foreign orders as a result of shipbuilders not coming to us before executing contracts. If the shipbuilders are building small-size ships, we would not be interested at all. But with the large size ships we desire to build ourselves, we do not want our yards filled up with foreign orders—that is, the particularly efficient yards for these large ships—with the result that we must wait until such time as the foreign orders were finished."

GRADUAL REDUCTION IN PRICES SOUGHT

There was, in this connection, reiteration of the intention of the Shipping Board to build something over 125 ships of 10,000 tons and upward. A tabulation showed 74 vessels of this class now under construction, and hasty estimates during the hearings gave a total of not to exceed 15 shipyards out of the 67 equipped to build ships of this size. The available ways for this class of hulls were figured as between forty and sixty. Apropos a discussion of the cost of the new construction, it was stated that in the case of yards where Government contracts for vessels of smaller size have been suspended, and an effort

Generated on 2024-09-12 08:04 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

has been made to arrange replacement contracts at a flat price, it is the hope of the Shipping Board executives "to get down to a flat price of $160 or $165 (33/6/8 or 34/7/6) a ton."

The attitude of the Shipping Board, as reflected in lengthy discussions by its officials before the Congressional committee, was one of desiring to see the price of new tonnage come down, but come down gradually instead of precipitately to the demoralization of the industry. Fear was expressed that unless some steadying and stabilizing influence be kept at work there might be a temptation on the part of some shipbuilders to, for the sake of keeping their plants in operation, accept contracts for foreign account at lower figures than would be justified by actual costs. The point was stressed that, for the sake of the permanent welfare of efficient American shipbuilders who know their cost of production, the Government desires that no foreigners shall get ships from American yards at a lower price than American owners pay and is solicitous that Yankee shipbuilders, in their eagerness to fill their yards, shall not figure too closely and in consequence name a tonnage quotation that would be heralded all over the world as "the American market price," and which would have to be met by all shipbuilding interests in quest of foreign commissions to build ships.

Shipping Measures Before Congress

SENATE BILLS

S. 153	Jones, Wash., May 20.—Providing for sale or charter and operation of vessels owned by the United States.
S. 633	Jones, Wash., May 23.—Extending provisions of the regulation of steam vessels to vessels owned and operated by the Shipping Board.
S. J. Res. 26	Ransdell, La., May 23.—To return Coast Guard to Treasury Department.
S. 556	Sheppard, Tex., May 23.—To provide for the establishment of free zones in American ports of entry.
S. 575	Fletcher, Fla., May 23.—To establish loadlines for certain vessels.
S. 1652	Walsh, Mass., June 11.—To establish free zone in port of Boston, Mass.
S. 1651	Jones, Wash., June 11.—To construct Pacific cable.
S. 2233	Jones, Wash., June 23.—Authorizing and providing for various aids to navigation and other improvements under Lighthouse Service.
S. 2253	Jones, Wash., June 23.—To authorize suits against the United States in admiralty, etc.
S. 2288	Jones, Wash., June 23.—To provide for establishment of free zones in American ports of entry.
S. 2523	Calder, N. Y., July 17.—Providing for licensing of radio apparatus and operators, etc.
S. Res. 92	Fletcher, Fla., June 24.—Prohibiting sale of United States vessels to foreigners, except when useless to this country; prohibiting sale of any desirable vessels at this time.

REPAIR FACILITIES ENCOURAGED

In the course of the hearings before the merchant marine body of the House there was some discussion of the policy of the Shipping Board with respect to the provision of dry docks and facilities for repairs. In behalf of the Board it was stated that this Federal agency is expending about $25,000,000 (£5,130,000) in the construction of ten large dry docks, and was at the same time extending every possible encouragement to private interests to provide installations to the same end. There was instanced the case of a New York corporation that has been in negotiation with the Shipping Board in contemplation of an investment of $8,000,000 to $10,000,000 (£1,640,000 to £2,050,000) in a dry dock plant, and Mr. Hurley, in the course of his remarks, said that the Board hoped to see an expenditure of not less than $50,000,000 (£10,250,000) in the aggregate by private parties for the provision of dry dock and repair facilities. "We are trying to get out of the repair business and get private parties into it," he commented.

While the committees of the Senate and House of Representatives have manifested a certain impatience over the desire of the Shipping Board to retain the power of censorship with respect to private contracts that private shipbuilders may desire to enter into, there has been in these committees little spirit of criticism of the Shipping Board's policy in selling off tonnage. In the main body of the Senate and House, however, there are a number of insurgents who are beginning to be heard from on this score. For example, early in August, Senator Fletcher, former chairman of the Senate committee on commerce, led an attack upon the whole policy of the sale of the Shipping Board's tonnage for foreign interests at private sale. The element in Congress whose view is voiced by Senator Fletcher is opposed to the sale of any Government-owned tonnage whatever, and is especially insistent that if such transfer is to be made it should not be as the result of private negotiations, but only as the outcome of competitive bidding. The argument of these critics of the Shipping Board policy is that transactions such as the reported sale of one hundred steel ships of the Great Lakes type to French and Italian interests operates to build up foreign merchant marines, thereby sharpening the competition to be faced by the new American merchant marine.

SHIPPING BOARD DEFENDS ITS SALE OF SHIPPING

The defense of the Shipping Board, as set forth in the various Congressional quarters where there has been opportunity to reply to criticism, is that the tonnage sales on the part of the Board are wholly in an effort to modernize and "balance" the American mercantile fleet and to secure an appropriate number of ships suitable to commerce on the trade routes to which the United States must presumably in future devote special attention. Chairman Hurley, shortly before his retirement as chairman of the Shipping Board, stated that the Board desired to sell 1,000,000 tons to foreigners, but he denied that the Board had, as reported, adopted a permanent policy calling for the elimination from its fleet of all vessels under 7,500 tons. One of Mr. Hurley's final expressions of policy on this aspect of the situation was as follows: "We have about a million tons of small coal-burning Great Lakes ships which we are anxious to sell, and we want to take that money and build a larger type of ship, in order that our fleet will be proportionately balanced. Our whole thought is to balance our fleet so that we can compete with other nations in the trade routes throughout the world. It was with that thought in mind that the committee on appropriations authorized us to sell fifty or seventy-five million dollars' worth of old-style ships to foreign governments."

Advocates in Congress of conservation of the war-time accumulation of American merchant tonnage have expressed dissatisfaction over the sale of a few vessels of

Generated on 2024-09-12 07:59 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

tonnage between 7,500 and 9,500, but the Shipping Board has countered with the explanation that only a very few of these vessels have been allowed to go, and only to Americans rather than to foreign account. The general policy has been stated to be to hold on to the larger type of ships and the oil-burning ships. The rule of payment for all such transfers of tonnage has called for 25 percent cash, 7½ percent of the purchase price in six months, and another installment of 7½ percent at the expiration of the next six months, so that 40 percent of the purchase price is paid by the close of the first year. Payment of the balance of 60 percent is distributed over a period of five years.

MARINE INSURANCE INVESTIGATED

While the main committee on merchant marine of the House of Representatives has been busy with considerations of shipbuilding and ship ownership incident to the present and prospective operations of the Shipping Board, a sub-committee, of which Congressman Lehlbach of New Jersey is chairman, has taken up the subject of marine insurance in an effort to formulate legislation providing for the insurance of the American merchant marine as it exists and as it will exist in the future. The sub-committee has, during the past month, called into conference a number of specialists on this subject. The opinion has been freely expressed that from the standpoint of the future of American shipping the legislation to be enacted with reference to marine insurance will be the most important that Congress will pass. Accordingly, the Shipping Board's specialists on marine insurance and a committee representing the marine insurance underwriters have given freely of their counsel.

A memorandum prepared for the Congressional sub-committee by B. K. Ogden, acting director of insurance, gives, for the first time, interesting information with respect to the Division of Insurance of the United States Shipping Board Emergency Fleet Corporation. It is shown that in January, 1918, the Shipping Board appropriated the sum of $10,000,000 (£2,050,000) to serve as a working capital for its insurance fund; but about one year later this appropriation was withdrawn, it not having been found necessary to use the funds and sufficient reserve having accumulated. An advisory insurance committee, which was in charge, administered this fund in the same general way that marine insurance companies conduct their business. Each steamer was entered in the fund at an appropriate valuation and at rates in accordance with the anticipated service. At first only war risks on requisitioned tonnage were handled, but when, last year, the steamers constructed by the Emergency Fleet Corporation began to operate, the fund assumed both marine and war risks on them from the date of delivery by the builders.

With the idea of not showing a profit, but of giving the Shipping Board adequate and sound protection at the lowest cost, the marine rates used in the insurance fund were based on market quotations less about 25 or 30 percent, this deduction being warranted by the saving in overhead. The annual marine rate for steel steamers was originally 3¾ percent, but, owing to heavy losses, the rate was increased in the autumn of 1918 to 4¼ percent, the insured values of steamers when less than ten years old being increased at the same time from $175 to $200 (36/9/2 to 41/13/4) per deadweight ton. For wooden and composite steamers the annual rate was originally fixed at 6¼ percent, and this was later increased to 7¼ percent. In February, 1919, the rate for steel steamers was reduced to 3½ percent, but the rate for wooden and composite steamers was raised to 7½, the insured values of both classes of vessels remaining as before, namely, $200 (41/13/4) per deadweight ton for steel, and $150 (31/5/0) per deadweight ton for wooden and composite. The rates for war-risk insurance ranged downward from 5 percent in 1917 to ⅛ of 1 percent following the signing of the armistice.

The Shipping Board officials have recommended to the Congressional committee that the Government continue to carry its insurance and distribute claims over the entire fleet until such time as the Government disposes of the ships to private owners—pre-

Shipping Measures Before Congress

HOUSE BILLS

H. R. 7500	Scott, Mich., July 17.—To repeal law permitting foreign vessels to engage in coastwise trade during war. Report by Merchant Marine and Fisheries Committee July 19. Passed by House July 21. Referred to Senate Committee on Commerce July 14.
H. R. 7288	Mapes, Mich.—To require installation of wireless equipment on all vessels carrying passengers for fare and going out of sight of land. In Committee on Merchant Marine and Fisheries.
H. R. 7007	Britten, Ill., July 8.—To require all vessels 150 feet and over to carry wireless equipment. In Committee on Merchant Marine and Fisheries.
H. R. 5498	Greene, Mass., June 11.—Providing for sale and charter of Government-owned vessels. In Committee on Merchant Marine and Fisheries.
H. R. 3618	Alexander, Mo., May 28.—To protect halibut fisheries of Pacific Ocean. In Committee on Merchant Marine and Fisheries.
H. R. 3621	Alexander, Mo., May 28.—To establish loadlines for certain vessels. In Committee on Merchant Marine and Fisheries.
H. R. 5003	Greene, Mass., June 5.—To classify clerks of Steamboat Inspection Service. In Committee on Merchant Marine and Fisheries.
H. R. 4869	Fordney, Mich., June 4.—To amend provisions of Seamen's Act regarding arrests for desertion. In Commitee on Merchant Marine and Fisheries.
H. R. 491	Gould, N. Y., May 19.—To amend provisions of Seamen's Act regarding arrests for desertion. In Committee on Merchant Marine and Fisheries.
H. R. 1233	Edmonds, Pa., May 20.—To provide ocean mail steamship lines to South America. In Committee on Merchant Marine and Fisheries.
H. R. 3075	Nolan, Cal., May 26.—Prohibiting employment of other than American citizens as radio or telegraph operators on American vessels. In Committee on Merchant Marine and Fisheries.
H. R. 3617	Alexander, Mo., May 28.—To protect Alaskan fisheries. In Committee on Merchant Marine and Fisheries.
H. R. 3619	Alexander, Mo., May 28.—To abolish arrest and imprisonment for desertion. In Committee on Merchant Marine and Fisheries.
H. R. 3620	Alexander, Mo., May 28.—To authorize Commissioner of Navigation to change names of vessels. In Committee on Merchant Marine and Fisheries.
H. R. 4417	Walsh, Mass., June 2.—To establish a Department of Marine and Fisheries. In Committee on Merchant Marine and Fisheries.

Generated on 2024-09-12 07:51 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

suming that the entire fleet will eventually pass to private ownership. According to this plan the percentage of a ship's valuation represented by a purchaser's down payment would immediately be covered by a private insurance company, whereas the Government would continue to carry the remainder. This distribution of the risk would be revised at yearly or semi-yearly intervals in accordance with the gradual reduction of the mortgage held by the Government. This plan for Governmental participation in the marine insurance business is being urged on the plea that the marine insurance companies are not at this time strong enough to take over the total risks on the entire fleet, but that a plan of gradual transfer of risks will enable the private insurance interests to develop strength to bear the burden, and thus the Government can get out of the marine insurance business and the shipowning business at approximately the same time.

American Vessels to Be Insured in the United States

The sentiment expressed at the hearings on the insurance question was that it will be important for the United States to be as nearly self-sufficient as possible in the provision of marine insurance for its fleet as a means of withholding trade secrets from British or other foreign interests. Pursuing that same line of thought there was expression of the conviction that if the United States is to maintain a great merchant marine it is advisable to arrange for American facilities for every essential service—that is, for American registration of ships, loadlines, etc., as well as insurance. Incidentally, it was revealed that during the war the Shipping Board endeavored to give from 65 to 70 percent of all inspections to the American Bureau of Shipping and the remainder to Lloyds. Ability of the American institution to take the entire responsibility in future was intimated to be contingent to some extent upon their willingness to establish foreign branches that will, in some measure, parallel the service that Lloyds is now enabled to render through its agents in foreign countries.

William H. McGee, of the firm of William H. McGee & Company, of New York, appeared before the merchant marine sub-committee as the representative of twelve American marine insurance companies and spoke encouragingly of the possibilities for the development of American underwriting capacity. "Business begets capacity," he remarked. "Where there is business to be placed, the market will be found," and then went on to recite incidents illustrative of the change in conditions that has taken place since 1910, prior to which year it was, he said, difficult for an American shipowner to place more than 10 or 15 percent of the value of his vessel in the American market. At the same time Mr. McGee pointed out certain handicaps that are just now faced by the group of American companies that is in co-operation for the appointment of agencies throughout the world.

Stevenson Taylor Advocates Compulsory Loadline

Commander Stevenson Taylor, president of the American Bureau of Shipping, told the sub-committee the history of the institution of which he is the head and which he proclaimed it his ambition to have do for the American merchant marine what Lloyds has done for British shipping. When, however, Commander Taylor was asked for suggestions for legislation that would be helpful at this time he addressed himself to the necessity for the establishment in this country of a legal loadline. "We must have a law passed," he explained, "that will compel every sea-going vessel to have a loadline. The time is coming when we must have a loadline which must be established by the American Bureau of Shipping." Incidentally, he held out the hope that the spirit of opposition which has been potent in the past may be eliminated if distinctive classes of service, such as the coastwise trade and the Great Lakes trade, be considered separately and loadlines be fixed in accordance with their individual needs and limitations. "All these trades must be considered by themselves," he explained, "because they all differ."

Appearing in the capacity of vice-president of the American Bureau of Shipping, Commodore E. P. Bertholf likewise laid great emphasis upon the need for legislation establishing a loadline. He pointed out that, whereas the American Bureau of Shipping is now marking the loadline for the ships built for the emergency fleet, the loadline is not compulsory under the law, as is the case in other countries. He felt that just in proportion as the strength of the American merchant fleet has grown since the beginning of the war has this question of the loadline become acute. He took the view that, whereas uniformity of loadline requirements must wait upon the completion of the project already initiated by the International Conference on Safety at Sea, "the United States can go into that conference much better if backed by a loadline law."

Commander Bertholf also came out vigorously in favor of an all-American policy for all the ramifications of our merchant marine. Speaking to this text he said: "Every element that goes to make up what is called American shipping should be governed and controlled by Americans; otherwise it is not American shipping. There is no reason in the world why American shipowners should have their ships classed, insured or anything else abroad. You cannot expect the people abroad to lie awake nights to help American shipping as against their own shipping. Therefore all elements—the underwriters, the shipowners, the shipbuilders and the ship operators—should look to American institutions for those things they need. That is fundamental—American interests are best served in American institutions."

An Interesting Towing Feat

When the steamship *Alcona* was preparing to leave Balboa for Antofagasta recently, her chief engineer, Mr. Esmeraldo, was asked by an official of the United States Shipping Board whether he could tow to that port a French bark loaded with 3,000 tons of coal.

This was a serious proposal, for several reasons. In the first place, the *Alcona* was already deeply loaded. Secondly, the only hawser available was but 200 fathoms long, which would bring the bark within the back water of the steamer and thus make towing difficult. Thirdly, the screw of the *Alcona* was not proportioned for towing work, and, finally, the chief had no information as to how the ship's geared turbines would stand up under such a test. However, he had the greatest confidence in the *Alcona*, her equipment and her crew, and undertook the job.

The tow started, and fourteen and a half days later the *Alcona* and her charge finished the 2,000 nautical mile voyage without the slightest hitch. The machinery performed splendidly, without groaning or laboring, and with no undue heating at any point. The average speed was 6.3 knots and only a slight increase in the daily fuel consumption was noted.

The *Alcona* is a steel cargo steamer 335 feet long, 46 feet beam, and 28 feet 6 inches depth, of 3,658 gross tons, built last year for the Shipping Board by the Submarine Boat Corporation, Newark, N. J. The vessel's propelling machinery consists of two oil-fired watertube boilers and a set of Westinghouse geared turbines driving a single screw.

Generated on 2024-09-12 08:02 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Shipbuilding in Foreign Countries in 1919

Output of American Shipyards Exceeds That of All Other Countries Combined—Great Britain Leads Foreign Builders—Japan Rapidly Forging Ahead

BY HARWOOD KOPPEL

IN 1918 the United States produced about 50 percent of the total number of merchant vessels launched and about 55 percent of the total tonnage of these vessels, in all, 929 ships of some 3,033,030 tons, which was three times the number produced in the United Kingdom, where 301 were put overboard. The British Dominions, however, launched 206 more craft. The tonnage of the vessels constructed in the United Kingdom was 1,348,120, considerably less than half of that produced in the United States, and with the 279,904 additional tons produced in the Dominions only equaled a bit more than half of the tonnage produced in this country. The British output for 1918 was smaller, however, than the output for the preceding year, when 1,162,896 tons were produced in the United Kingdom and 94,471 tons in addition in the Dominions. In that year the number of vessels constructed was smaller, however, for but 286 were turned out in the United Kingdom and 105 in the Dominions.

French Yards Inactive

France had almost ceased shipbuilding activities in 1918, turning out only three vessels of a combined tonnage of 13,715. Although France was never a great shipbuilding nation, her greatest achievement in recent years was in 1913, when she turned out 89 vessels of some 176,095 tons. Figures are not available for German and Austrian shipbuilding during the war, but with incomplete returns for 1914, Germany built 89 vessels of 387,192 tons. The previous year the German Empire had constructed 465,226 tons of shipping divided into 162 vessels.

The United States in 1914 launched 94 merchant craft of some 200,762 tons, while Great Britain put over 736 vessels of 1,731,087 tons. Japan, which in 1914 built but 32 ships of 85,861 tons, had by 1918 reached an output of 489,924 tons, comprising 198 vessels. During the previous year (1917), Japanese shipbuilding plants launched 104 vessels of 350,141 tons.

These figures, which are taken from Lloyds Register of Shipping, do not include warships nor vessels built to government order for other than mercantile purposes and include only vessels above 100 tons which were launched in 1918, irrespective of whether they were completed during that year or are now receiving their finishing touches. All sorts of shipping is included, however—steel,, composite, concrete and wood, and steamships, motorships and sailing ships. The United Kingdom put over the largest mercantile ship, the *Narkunda*, of 14,500 tons gross.

Output of Smaller Nations

Denmark turned out 13 vessels of 26,150 tons; the Netherlands, 74 craft of 74,026 tons; Italy, 15 ships of 60,791 tons; Norway, 51 merchantmen of 47,723 tons, and Sweden, 36 liners of 39,583 tons. All of the other countries combined only produced 34,478 tons, with returns not quite complete. This was divided into some 40 ships. The world total was 1,866 vessels of 5,447,444 tons.

Figures issued by the American Government for the twelve months ending March 31 show a total of 2,056 vessels launched of some 3,225,521 gross tons. Of these, 538 were steel vessels fit for going to sea, amounting to 2,178,939 tons, and 436 wooden seagoing ships of 916,037 tons. These figures do not agree with Lloyds, nor do the figures for 1918 given out by the Government for vessels "built in the United States and officially numbered by the Bureau of Navigation, Department of Commerce," agree with Lloyds, but this is explained by the fact that Lloyds figures are for vessels launched only, and do not include craft of less than 100 tons, while the Government figures are for all classes of craft, seagoing and otherwise, of any tonnage. The Government is modest and shows only 821 vessels against Lloyds 929 for seagoing purposes, and only 2,597,026 tons of seagoing shipping against Lloyds 3,033,030 tons.

Tonnage Building Throughout the World

At present, according to Lloyds, there are 2,189 vessels of 6,921,989 tons being built throughout the world, and of these 1,427 are of steel, comprising a tonnage of 5,665,434. The wooden vessels comprise 1,151,828 tons, divided into 591 craft. In this lot there are 13 steel sailing vessels of 12,215 tons and 158 wooden sailing ships of 89,512 tons. The total tonnage under construction is double that of the world before the beginning of the war. Concrete vessels are included in the steel tonnage. There are 14 under construction now, of some 26,370 tons.

Of the foreign countries the United Kingdom is building the greatest number, there being 414 steel vessels of 1,975,962 tons under way there and 2 wood ships of 1,240 tons, while our next door neighbor, Canada, is busy with 31 steel ships building on the Great Lakes and 21 on the coast. The Lakes tonnage is 62,990 and the coast 76,666. All of the other British Dominions combined are building only 9 steel ships of 40,402 tons. Canada is also building one wooden craft of 2,400 tons on the Lakes and 48 wooden vessels of 61,139 tons on the coast, while the other Dominions are building 10 wooden ships of 4,858 tons.

Opportunity to Export American Materials

Aside from the ships to be constructed in the United States in the near future, this country should prepare for a still further enormous expansion of the material industry, particularly in plates. This, in the opinion of the writer, will be due largely to the fact that with the rich iron and coal regions of the former German Empire in French possession, Germany will not be in a position to compete with this country in shipbuilding material, while Great Britain can use practically all of its own output in its own industry, and France, which will have the working of the Alsace and Lorraine ore mines and the Sarre Valley coal mines, will need its steel output for industrial purposes other than shipbuilding. Should France decide upon a comprehensive programme of shipbuilding, which is likely, since at present there are but 12 steel ships of 51,690 tons being constructed there, there will be a further demand on the French ore deposits—for the benefit of France only—and the field will practically be cleared for the United States to step in and gain a strangle hold on this valuable and profitable foreign trade. Should some of the French ore go to Germany, it is unquestionable

Generated on 2024-09-12 08:04 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

that the Germans can use this steel to better advantage in rebuilding their own merchant marine, which has suffered much at the hands of the Allies, than in re-exporting it to other countries, and even if they do so they cannot do it at the relative underselling that had once been their wont.

At present Japan does not have under construction the amount of shipping that she turned out in 1918, as there are only 89 steel vessels of 257,777 tons on the ways, but further additions are expected from time to time, and the figures for the present year will undoubtedly be as high as they were last year, if not higher. There are also 27 wooden ships of 20,363 tons under construction in the Island Empire.

Holland is building 113 steel ships of 212,512 tons; Norway, 54 of 62,157 tons; Sweden, 48 of 89,368 tons, and Denmark, 45 of 70,258 tons. Italy is building ships of larger type, for the 20 steel vessels under construction there are of 112,300 tons. The Italians are also working on 26 wooden craft of 16,500 tons. China is constructing 6 steel ships of 8,968 tons and 10 wooden ones of 4,858 tons, and Spain 30 steel vessels of 76,335 tons.

Scandinavian Shipbuilding

Shipbuilding in Scandinavia will undoubtedly be encouraged by the sale of many vessels now owned in these countries, which are to be offered to foreign buyers. For instance, Norway during the war prohibited its ship owners from disposing of their vessels to the nationals of other countries, belligerent or neutral, but the Norwegian Steamship Owner's Union has petitioned the government that the prohibition against the sale of ships to foreigners be cancelled. Failing in this, they desire that they at least be permitted to sell all ships over twenty years old and all ships bought during the war, irrespective of their age, and all wooden and concrete ships. This association naïvely points out that the owners can now secure good prices for these ships, which will enable them to build new ones for what they receive for these obsolete craft, which will be a big stimulus to the shipbuilding industry of the country, and, anyway, most of the ships purchased during the war are uneconomical and in poor shape.

In order to economize on shipping space on lumber, Aktieselskabet Maraker Bruk in Norway is building a lumber raft to be towed across the North Sea. The lumber in this raft would require 5,000 tons of shipping to carry it across, and it is considerably larger than the raft which was towed some time ago from Finland to Copenhagen. Captain Gardiner, of the Gardiner Shipbuilding Company, is directing the construction of this raft and will supervise the building of a number of others.

But, on the whole, work is not progressing at a rate which one might expect with the shortage of tonnage due to the losses of the Norwegian shipowners during the war. Inability to secure necessary materials is given as one of the principal reasons, one of the delays being due to the fact that orders for 25,000 tons of plates placed in Germany some time ago have not materialized as yet, and the prospects are that when the Germans have such a quantity of plates they will go to German and not Norwegian shipyards.

In Sweden there are signs of renewed shipbuilding activity, mostly seen in the expansion of capital by various firms and the organization of new companies. The fact that the Swedish iron mines produce such high-grade ore, from which plates were made and exported during the war as high as $250 (52/1/8) a ton, has had the effect of causing the rolling mill owners to seek a market for their product in other countries, rather than use their plates in their own shipyards. In the days before the war Sweden imported shipbuilding plates from Germany and Great Britain. The Germans are reported as already making bids for the Swedish trade on plates, quoting prices of $50 (10/8/4) per ton, f.o.b. German ports; but the inability of the German exporters to give a guarantee of the time of delivery, due to the disturbed economic condition of Germany, has deterred Swedish shipbuilders from placing heavy orders.

American Shipbuilding Materials for Denmark

American exporters of shipbuilding materials are being encouraged by the shipbuilders of Odense, Denmark, who realize that the American materials are in a better position to compete with German materials than in the years preceding the war. American steel exporters have already been approached by A. P. Mollers Staalskibsvaerft, which placed a ship construction plant in operation early this year. This firm has secured a site near the mouth of the Odense Canal, where it empties into Odense Fjord, there being a convenient bend here for launching ships.

This yard is to be one of considerable size, as about 15,000 tons of shipping will be constructed each year. A force of 500 men will be employed, and the company will specialize on ships of 3,500 tons. The machinery for the plant, which was ordered in Denmark, has been received and installed, and work was begun on the first ship in January.

This company desires to purchase a floating dock in the United States, and there is a splendid chance for the builders of docks to secure a handsome order by getting in touch with these people.

Svendborg, one of Denmark's important ports, just about 25 miles across the Little Belt from the German coast, is also experiencing a boom in its shipbuilding industry. Yards were first established in this place about twelve years ago, and during the war were expanded to large proportions. The Svendborg Skibsvaerft og Maskinbyggeri, which operates this yard, is now busy securing prices on steel from the United States suitable for its work.

In Denmark the Burmeister & Wain shipyard recently completed the *Bonheur*, a 7,133-ton motorship, for Fred Olsen & Company, a prominent Norwegian shipowning firm. This is the largest motorship flying the Norwegian flag. Her maiden trip was made to Buenos Aires to secure a cargo of grain for the Norwegian Government.

Japan's Rapid Strides in Shipbuilding

"Vast" is the only word that adequately describes the shipbuilding programme of Japan, for nearly all of the leading shipbuilding firms of the country are to be extremely busy. The Kawasaki Dock Company has announced an increase in capital to $24,900,000 (£5,100,000), with the statement that the greater part of the new shares would be given to the workmen who have worked faithfully in the company's service. K. Matsukata, president of this company, spent three years in England, and since his return to Japan the company has not only increased its capital but shows other signs of activity. The Daifuku Steamship Company, with a capital of $9,960,000 (£2,040,000) has also been established by Mr. Matsukata, and a large chemical factory as allied industries with his shipbuilding plant.

The Mitsubishi Shipbuilding Company, with plants at Kobe and Nagasaki, the Kawasaki Dock Company of Kobe, and the Asano Shipbuilding Company of Yokohama, the Uraga Dock Company and others, are all ex-

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

panding on a large scale, for 181 steamers of more than 1,000 tons deadweight, and in all aggregating 1,189,285 tons, are to be constructed in the little Island Empire this year.

The Kawasaki Dock Company is to construct 37 of these vessels, aggregating 330,000 tons; the Uraga Dock Company is to build twelve, of 91,260 tons; the Asano Shipbuilding Company is to turn out ten vessels of 88,000 tons, and the Mitsubishi Shipbuilding Company is to construct ten ships at Nagasaki of 74,300 tons and six at Kobe of 33,500 tons. The Osaka Iron Works is to build nine vessels of 83,000 tons at Sakurajima and eight of 74,000 tons at Innoshima.

Contracts for the others range from eight, aggregating 67,500 tons, with one of the companies down to only one vessel of 2,000 tons with another.

CHINESE SHIPYARDS ACTIVE

More activity is also manifested at the Chinese shipyards of Shanghai. The Kiangnan dockyards, where in the last ten years 316 ships have been constructed, mostly by hand, and a number for the use of the American Government for use in Philippine waters, are said to be unusually busy. Repair work, however, was responsible for the better part of this activity, but new work is also in sight. Using, as it does, hand labor, the plant would be called antiquated if compared with a modern American or European shipyard, but it gets along in its own unobtrusive way, as evidenced by its record of 31 vessels a year constructed, and its workmanship is so highly thought of that Lloyds will insure the vessels built here for twenty years.

This plant is located on the Whangpo River above both the native city and the foreign settlement. It is under the direction of Admiral Liu and Mr. Kwong, Sr., but its technical administration is in charge of a number of Europeans and Chinese. That much new work is to be done may be judged from the fact that five new ways are under construction and the present ways already line the Whangpo River for several thousand feet. A 1,200-ton ship of the composite type, with steel frames and wood sheathing, is partially completed. When the plate situation eases up sufficiently for the steel plates to be secured, work is to be started on several steel ships.

Repair work occupies much of the energy of the plant at present, and it is well arranged to handle such work. There is a dry dock of 523 feet which opens into the Whangpo River, where there is 16 feet of water even at mean low tide. New outside cranes are being erected, which will materially increase the efficiency of the plant.

CANADA BUILDING UP SHIPBUILDING INDUSTRY

Our next door neighbors, the Canadians, are alive to the possibilities of ship construction, and even during the winter, when numbers of Canadian seaports are virtually closed, the shipyards have not been idle. This was particularly true at Quebec and at Levis, across the river from that city.

Ways have been constructed by the Quebec Shipbuilding & Repair Company, and lumber is arriving for the construction of two wooden schooners at the new plant of this concern. The Canadian Government some time ago awarded the Davie Shipbuilding Company at Levis a contract for two 5,000-ton steel steamships, and only the inability of the company to secure steel plates and other materials prevented actual work being started on these vessels several months ago. This plant has been busy, nevertheless, constructing six steam trawlers for the Imperial Shipping Board. These craft are of 375 tons each and will soon be completed. Two barges built in the United States, which were brought down through the Great Lakes, were joined together at these yards, as they had to be cut into two sections to make the voyage.

The Canadian Government had contracted for a dry dock and shops here, and this plant will be in operation within a very short time. Delay in the construction of the boiler, pattern, machine and forge shops has held back its opening, but the dry dock proper is in a position to receive ships.

NEW YARD FOR HOLLAND

Holland is to have a new big shipyard between Schiedam and Vlaardingen on the New Waterway between the Hook of Holland and Rotterdam. This is to be directed by the chief engineer of the Ministry of Public Works, Dr. A. T. de Groot, who has requested a leave of absence for three years. It is to be operated and owned by the Wilton Machine Factory & Shipyard, which concern purchased 173 acres of land for that purpose. According to reports the docks will be of the basin type, below the level of the water in the Maas. One of these docks will be large enough to enable the company to construct two vessels of about 650 feet each and eight craft of 325 feet each all at the same time. A second dock will be constructed to accommodate a 1,000-foot vessel. In conjunction with these ways a floating dock will be constructed in which ships of 40,000 tons may be docked. According to the *Nieuwe Financier en Kapitalist,* an important periodical of Holland, this will be the largest shipbuilding plant in Europe.

ITALY NEEDS NEW TONNAGE

Italy some time ago was busy building ships with material furnished by Great Britain. The Consorizo Construttori Navali, or Association of Naval Builders, had contracts for twelve freighters of 8,000 deadweight tons each and one for a vessel of 6,000 tons. This contract was given early in 1917, when it was estimated that it would take several years to complete the job. Some 40,000 tons of material were purchased in England and arrangements made with the British Government to expedite the shipments of these supplies. As to what the present condition of this contract is it is hard to say.

Italian shipping losses during the war have been estimated as high as 60 percent, on which basis it is believed that about 3,000,000 tons of new vessels will be required both to replace these losses and to take care of future needs. Practically all of this is yet to be built, as reports are to the effect that only some 150,000 tons have been completed so far.

FUEL OIL DANGERS.—According to a memorandum issued by the marine department of the British Board of Trade, cases have been reported recently in which men employed in cleaning or carrying out repairs in oil tanks, or in working cargo in holds situated above double-bottom tanks in which fuel oil is carried, have been asphyxiated or poisoned by the fumes or gases given off from the oil or cargo. To guard against such accidents, the Board of Trade has issued the following recommendations:

When fuel oil is carried, whether in double bottoms or elsewhere, care should be exercised that the tanks containing the oil are thoroughly oil-tight.

The utmost care should be taken to ventilate thoroughly all spaces in which oil has been carried, as well as any adjacent spaces in which vapor may have accumulated, before men are allowed to enter such spaces. Thorough ventilation is necessary in all cases.

Generated on 2024-09-12 08:04 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

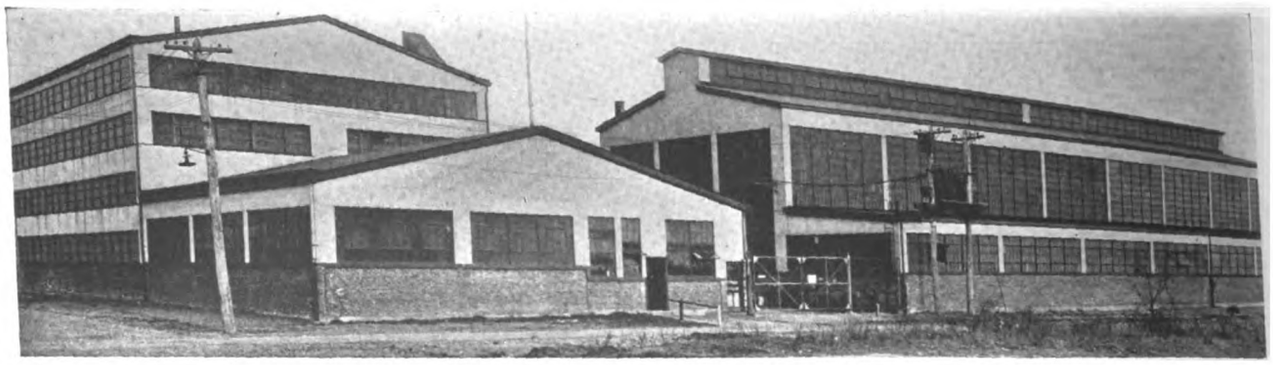


Fig. 1.—Corner of Plant of Staten Island Shipbuilding Company

Staten Island Shipyard Greatly Enlarged to Meet Demands for War Work

IN April, 1917, the Staten Island Shipbuilding Company, New Brighton, N. Y., operated a plant at Port Richmond, Staten Island, engaged chiefly in building tugboats, repairing barges, dredges and steam yachts. Here also marine Scotch boilers and reciprocating engines were built and repaired. In addition, a small auxiliary yard existed at Mariner's Harbor, where two ways and a few shops cared for the overflow from the Port Richmond plant. Immediately after the entrance of this country into the war it was decided by the officers that future developments of the plant to care for the demands of the government must be made at the Mariner's Harbor yard because of the space available at that location.

Additions to the Plant

To this end a certain amount of new construction became necessary at once. Between that time and the early part of 1919 the company had constructed a new four-story concrete and brick office building, 92 feet by 48 feet; a boiler shop, 60 feet by 250 feet; an auxiliary shop for stack work, 40 feet by 200 feet; a four-story concrete storehouse, 69 feet by 77 feet; a 187-foot by 42-foot frame and angle shop, and a warehouse, 40 feet by 200 feet at the foundry. The existing mold loft, 130 feet by 225 feet, was remodeled and storerooms and shops fitted out on the first floor for joiner work, mold storage and millwright shops, and an addition to the plate shop was also made.

Two new concrete ways, 400 feet by 60 feet, have been completed and will adequately care for the construction of ships of 10,000 tons displacement. A unique feature of these ways is the arrangement of space beneath them for rivet storage, pneumatic tool storage, a riggers' loft and offices for the foremen.

The main joiner shop and machine shops are at the

Fig. 2.—Mold Loft with Storerooms and Joiner and Millwright Shops on First Floor

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

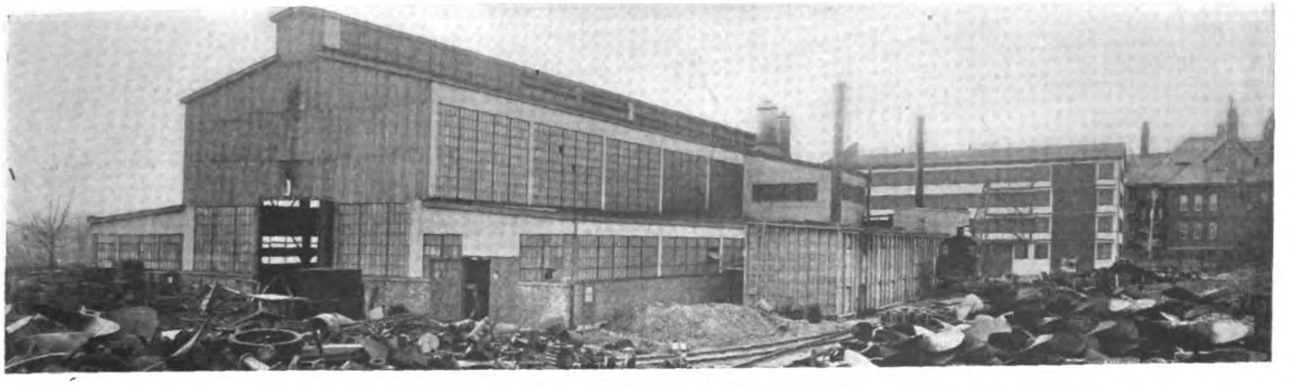


Fig. 3.—Foundry and Storage Yard for Castings

Port Richmond plant. This latter is now being used entirely for hull repair work on tugs, mine sweepers, barges and freighters, as well as for boiler and engine work, including both new construction and repairing.

Power Plant

The Mariner's Harbor yard is not large, but is laid out so that material may be handled in a most efficient manner. Power is supplied to the yard by the Richmond Light & Railroad Company at 6,600 volts and is transformed by three 5,000-kilowatt transformers to 440 volts and 220 volts for generators, electrical equipment and light in the yard. About 2,000 horsepower is used. There are two generator sets, totalling 200 horsepower, consisting of an Allis-Chalmers direct-current 200-volt, 600-ampere generator, driven by a 225-kilowatt motor, and a Westinghouse 220-volt, 250-ampere installation. Four compressors are required to supply the air for pneumatic equipment in the shops, as well as the pipe lines to the ships. One Worthington compressor with a capacity of 4,200 cubic feet per second and two Worthington compressors each with a capacity of 1,600 cubic feet per second maintain a pressure of 100 pounds in all the lines through the yard, with the exception of the boiler shop, where a pressure of 120 pounds was maintained by a 9-inch by 8-inch high-speed compressor supplied by the Chicago Pneumatic Tool Company.

The mold loft has sufficient floor space to lay out any of the ships that will be built in the plant. Beneath the mold loft, as already indicated, joiner and millwright shops are located, as well as storage spaces for these departments and the molds.

Angle Shop

In the angle shop two brick furnaces, built by the Quigley Furnace Specialties Company, are installed for plate and frame heating. The plate furnace is 13 feet by 30 feet, and that for the angles 2 feet 6 inches by 66 feet. The shop also includes a Quigley bar-heating furnace to supply an Acme 1¾-inch rivet-making machine, a 22-inch Hammond double-chamber furnace, two pneumatic hammers, one of 1,000 pounds and the other somewhat smaller, one electrical Porter & McDougal trip hammer for plate liners, and small forges for rivet and blacksmith work.

The main blacksmith shop is at the Port Richmond yard. All frames and angles are cut to shape and arc welded. General Electric equipment is utilized for this

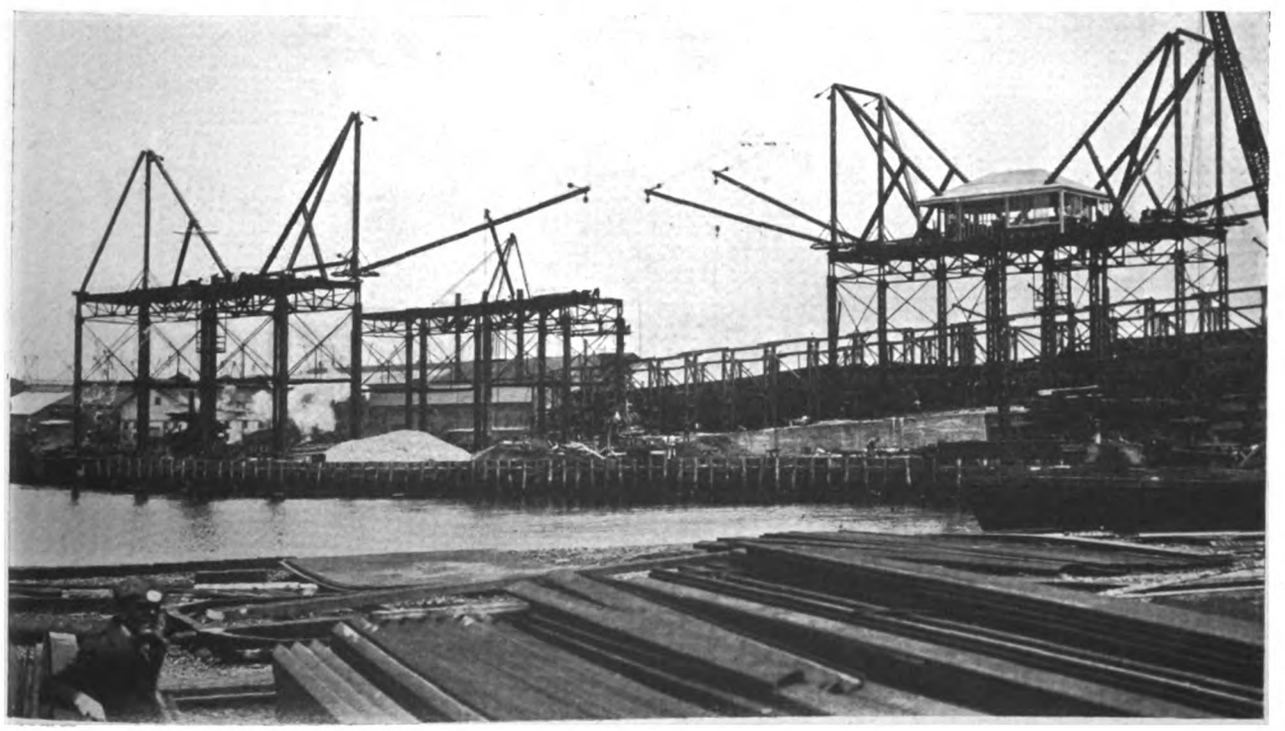


Fig. 4.—New Ways and Cranes

Generated on 2024-09-12 08:03 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

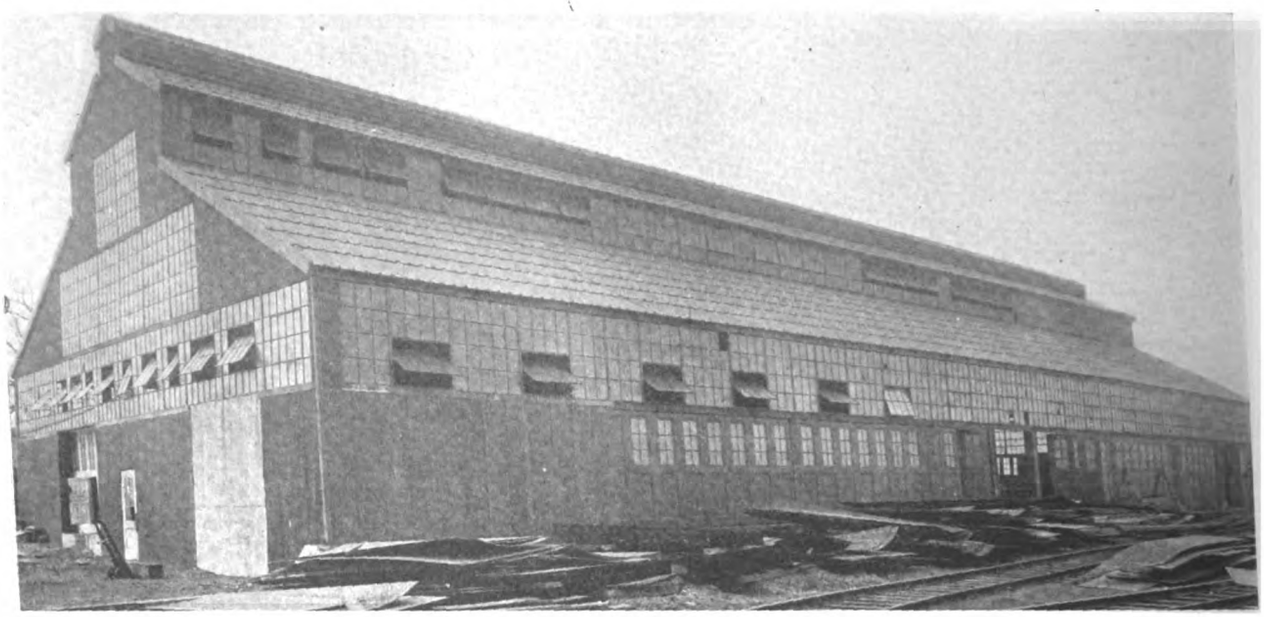


Fig. 5.—Angle Shop, Bending Floor Furnaces, Blacksmith Shop

work, while Oxweld apparatus is used for the oxy-acetylene welding that is done on castings.

Plate Shop

Tracks are laid from the plate shop, which is at the head of the ways, on either side of the ways to supply the ships under construction with material. The plate shop is equipped with machines adequate to care for any ships that may be constructed in the yard. This equipment includes a 5-ton Pawling & Harnischfeger crane and seven 3-ton jib cranes for the punches and other machines. The punches are one 3-foot 8-inch gap Cleveland for ¾-inch plates; one 3-foot gap Hilles & Jones for ⅝-inch plates; one 4-foot 6-inch gap Hilles & Jones; one horizontal punch for heavier work made by the Long & Allstatter Company, and another small Hilles & Jones machine. Three shears are sufficient for the needs of the shop; one is a Long & Allstatter, one a Hilles & Jones, and the third a special rotary cutter made by the Quick-work Company and capable of handling ½-inch material. One 22-foot Niles-Bement-Pond plate planer and one 25-foot Hilles & Jones planer are installed, as well as a Hugh Smith 1,500-pound hydraulic bending and joggling machine, built at the Possil Works, Glasgow, Scotland. This

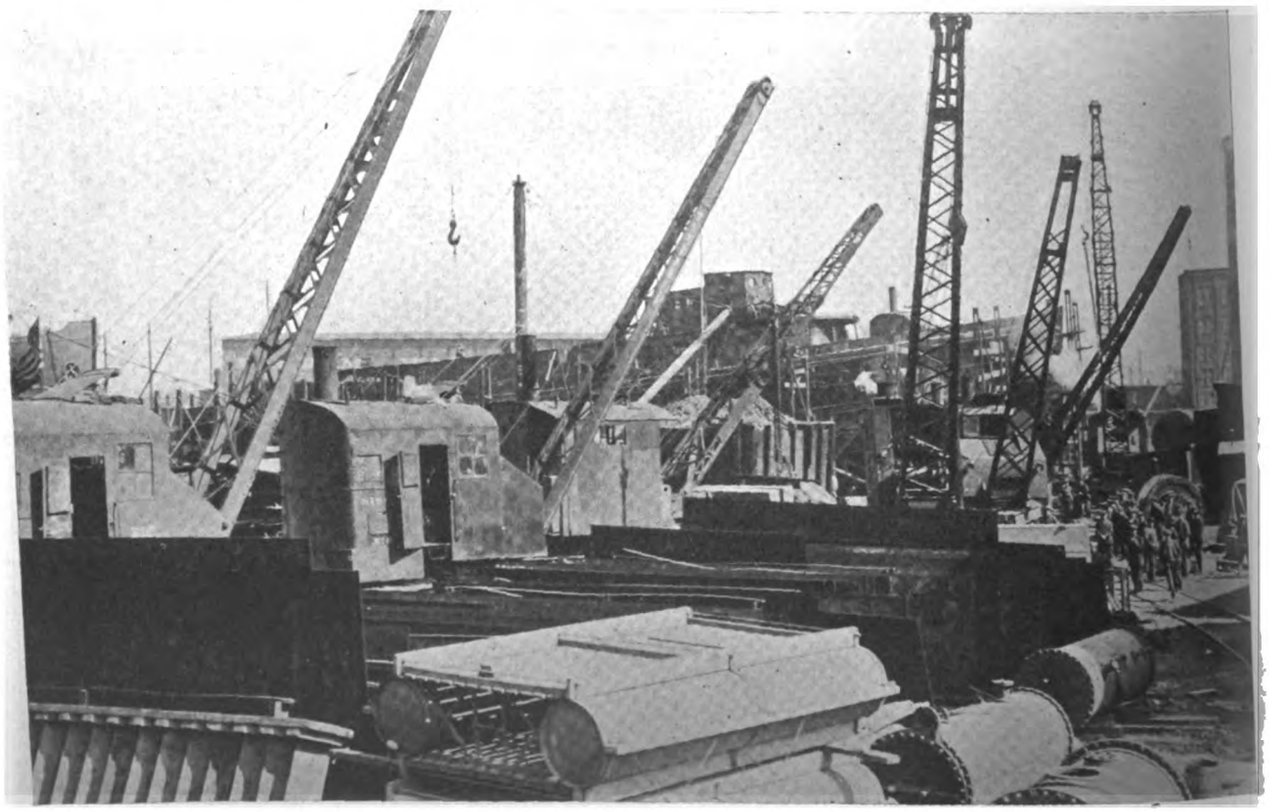


Fig. 6.—View Showing Locomotive Cranes Which Are Used for Handling Materials Throughout the Yard

Generated on 2024-09-12 08:01 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

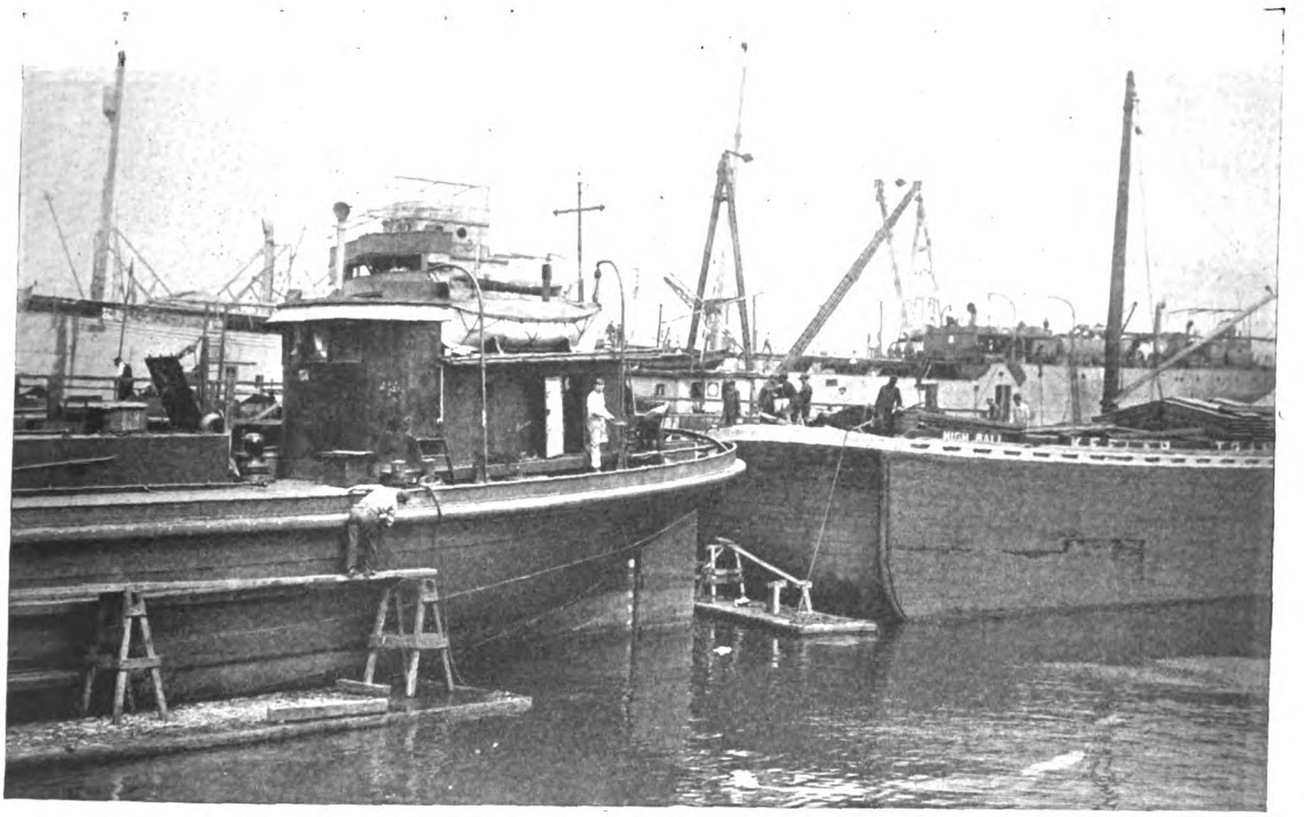


Fig. 7.—Repairing Ships Is One of the Most Important Features of the Staten Island Yard

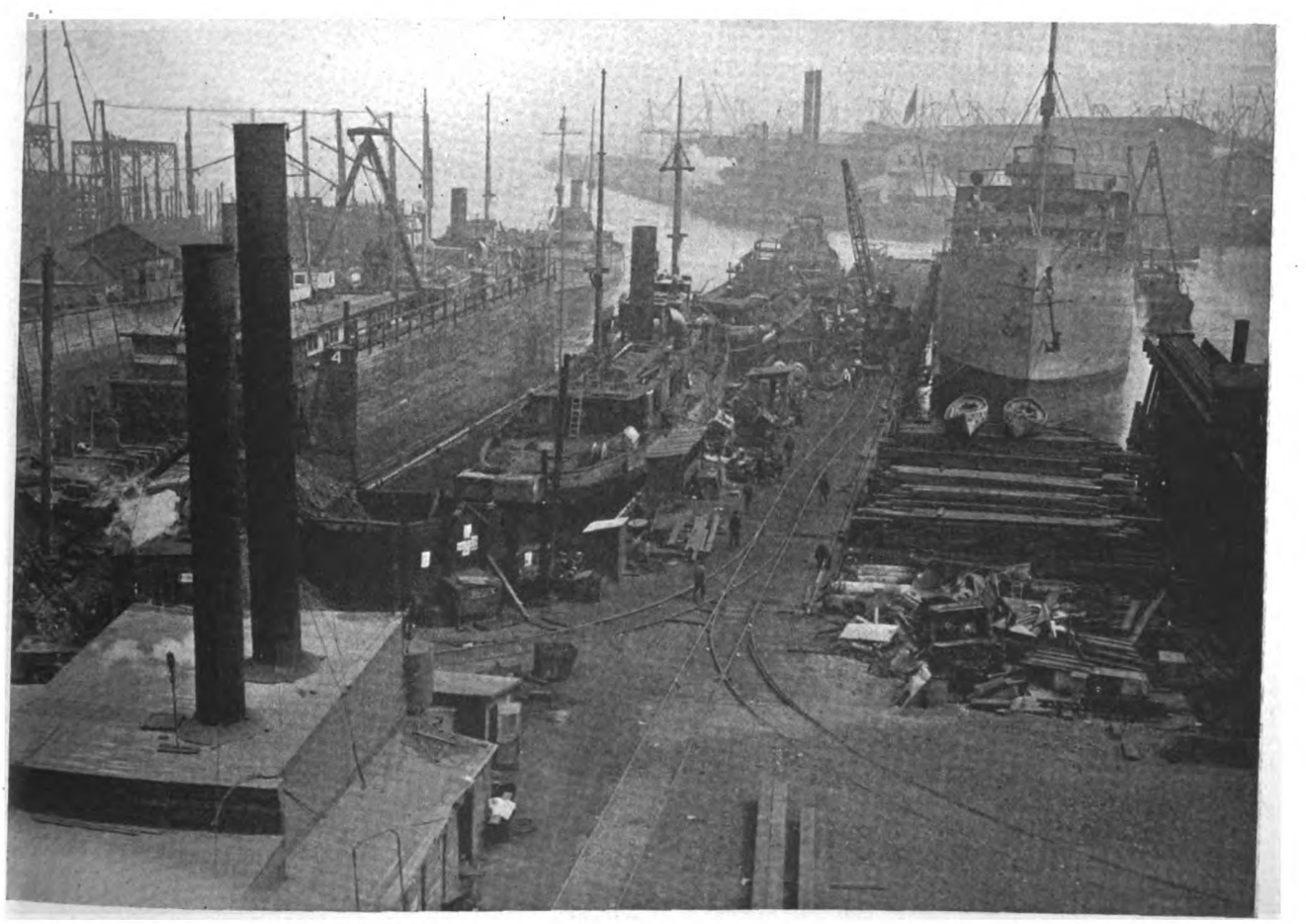


Fig. 8.—Dry Docks and Fitting-Out Slips

Generated on 2024-09-12 08:04 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Fig. 9.—Main Office

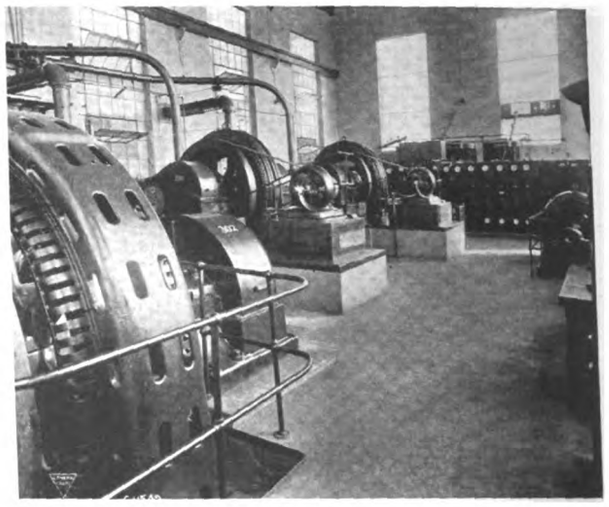


Fig. 10.—Power Plant

machine is capable of handling plates and angles up to 1⅝ inches. A set of 18-foot Niles Tool Works rolls, capable of handling plates up to 1¼ inches in thickness; two countersink drills made by the Dietrick & Harvey Machine Works, together with one Fitchburg Machine Works drill and one drill press care for all the drilling necessary in the plant. A special plate-scarfing machine, which bevels the plates so that liners are not necessary, has been installed in the last few months. To facilitate the labor of producing such parts as the stem bar and stern frame, a Gould & Eberhardt shaper is installed in the shop. A Lambies hydraulic flanging press is also included in the equipment.

Boiler Shops

There are two boiler shops built of brick and steel with modern daylight window arrangements. The main plant is 250 feet by 60 feet and has an extension at one side 40 feet by 60 feet for the flanging machinery and heating furnaces. About half of one of the walls of the building is built of tile, so that additions may be made to care for

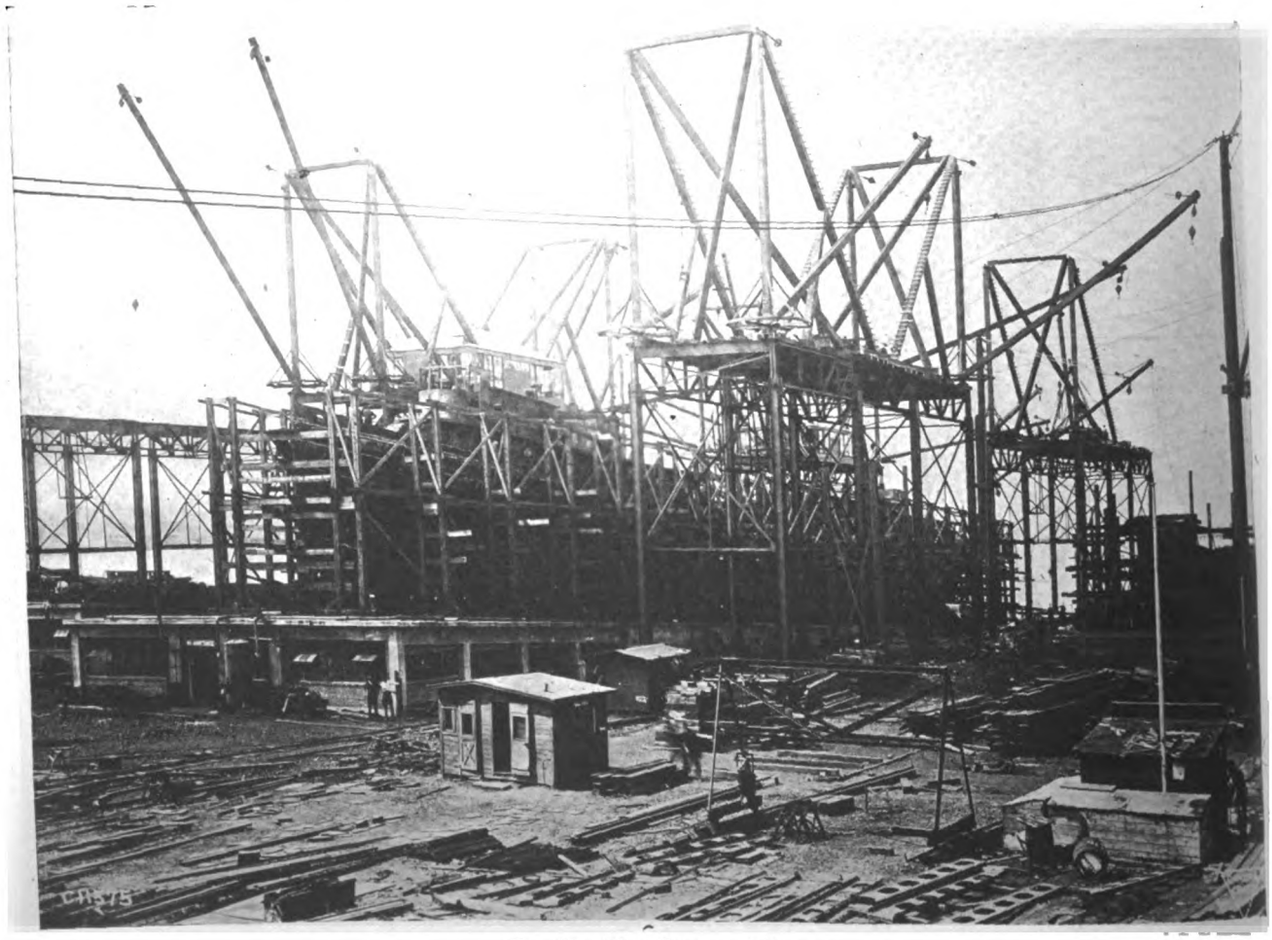


Fig. 11.—New Concrete Shipway

Generated on 2024-09-12 07:54 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Fig. 12.—New Boiler Shop

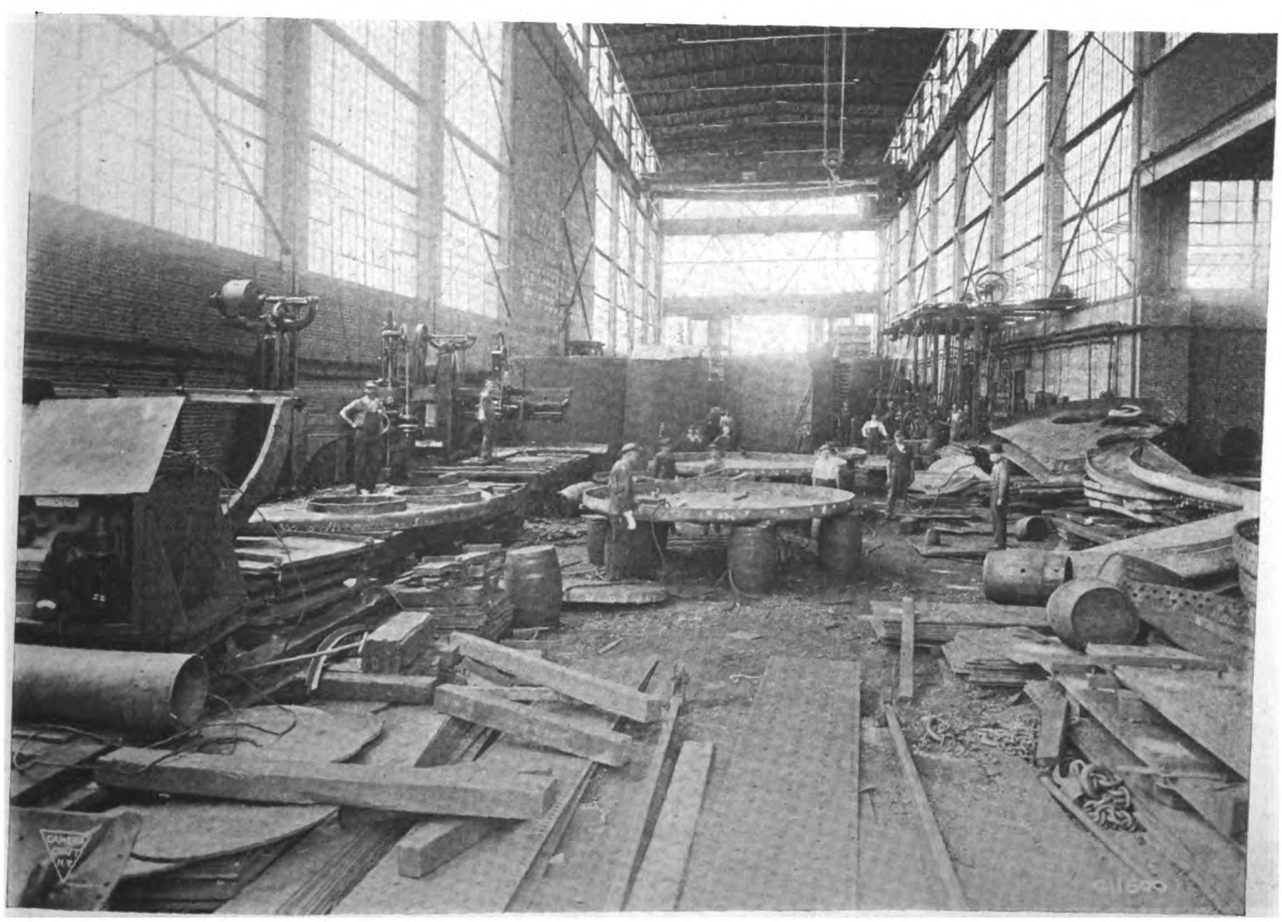


Fig. 13.—Interior of Boiler Shop

Generated on 2024-09-12 08:06 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

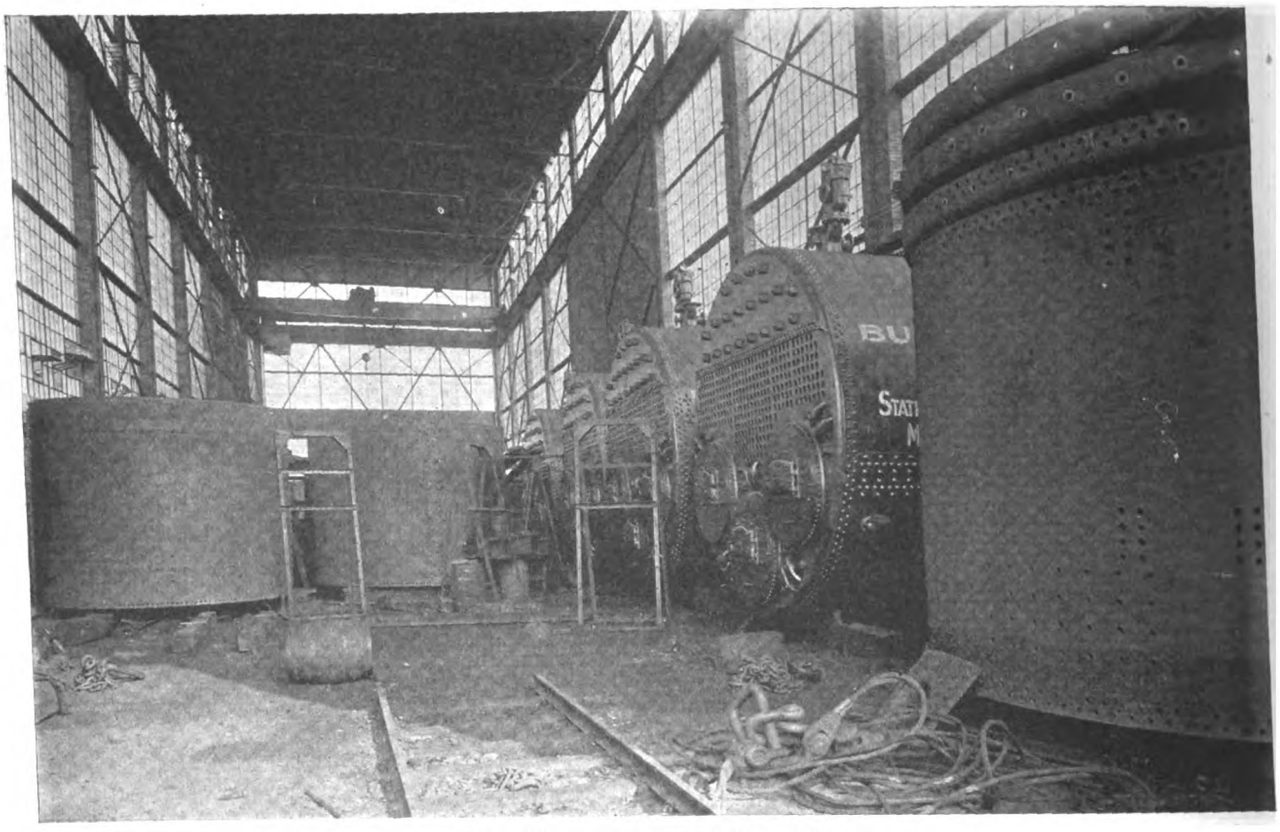


Fig. 14.—Testing Floor of Boiler Shop

Fig. 15.—Main Floor of Boiler Shop; Flanging Press in Extension at the Right

Generated on 2024-09-12 07:59 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

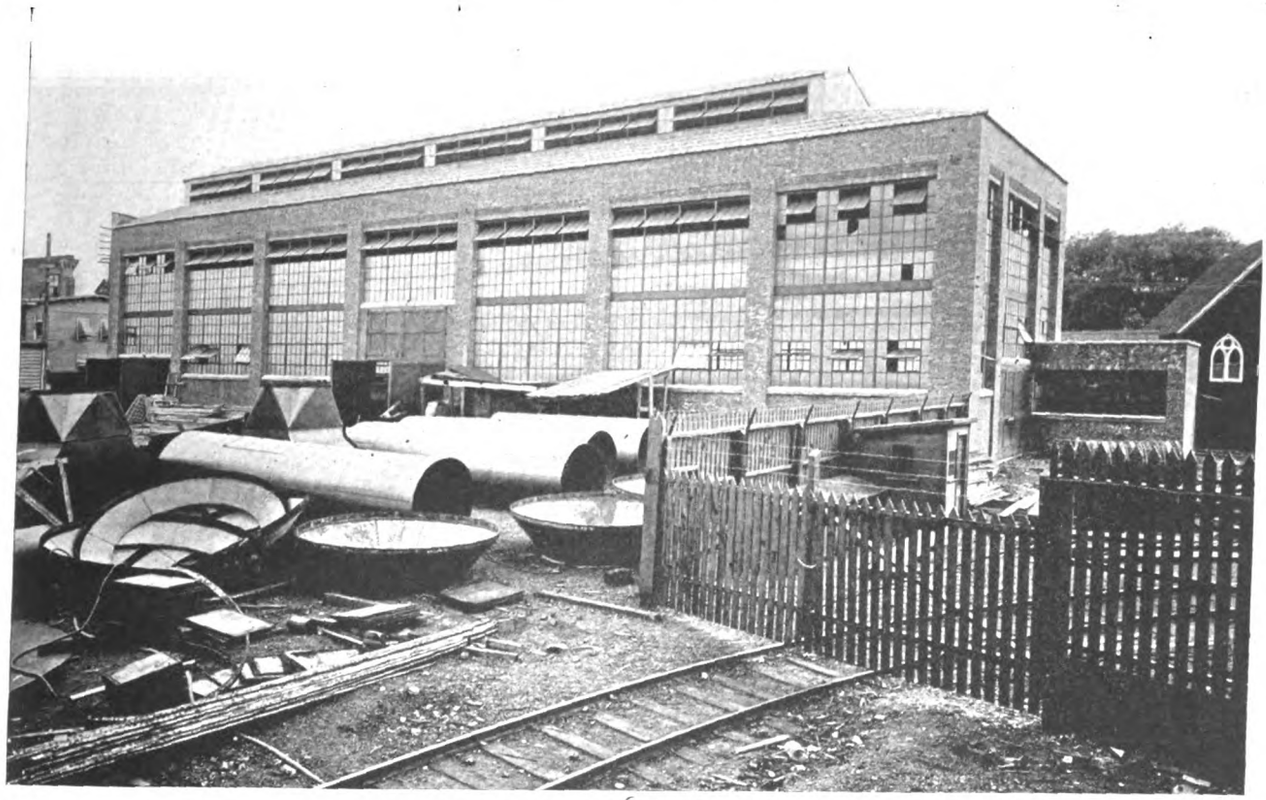


Fig. 16.—Auxiliary Boiler Shop

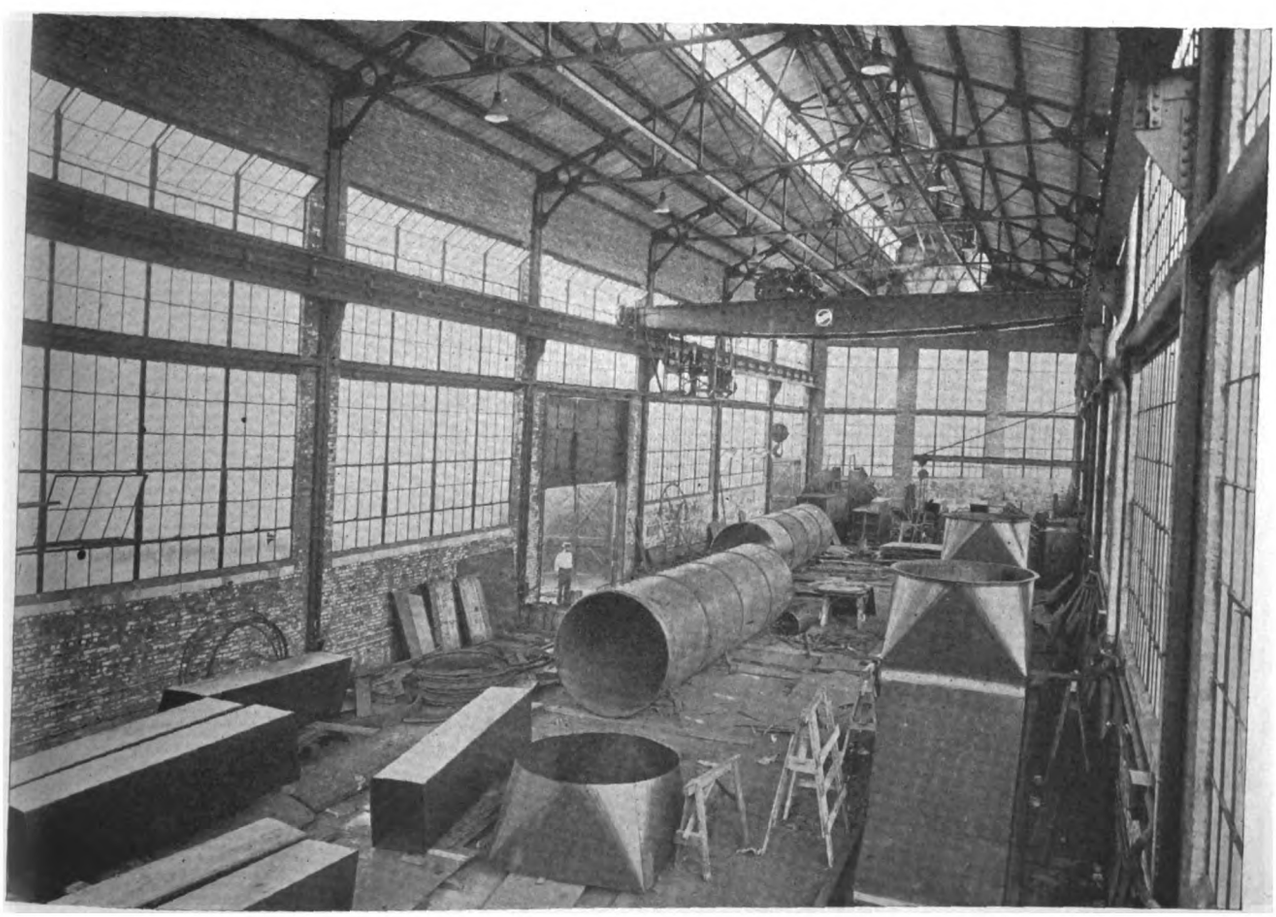


Fig. 17.—Tank and Stack Work Under Construction in Auxiliary Boiler Shop

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

future expansion without the necessity of tearing down the brick work.

Boilers up to a diameter of 17 feet can be built without difficulty, and at the present time one boiler is being completed a week. With certain additions to the equipment and space planned in the near future, the desired capacity of seventy boilers a year will be easily attained. Marine Scotch boilers have been specialized upon, and all the work of the shop is devoted to this type. All repair work is carried on in the old plant at Port Richmond. About eighty men are employed in the two shops.

Auxiliary Boiler Shop

Soon after the erection of the main shop in 1918, it was decided that the entire capacity would be required for boiler work, so that it became necessary to erect an auxiliary shop for building tanks, stacks, uptakes and the like required by the ships under construction in the yard. This shop is smaller than the main one, being 40 feet by 200 feet. It has only such equipment as punches, drills and pneumatic riveters for handling the thin metal used in stack work. A great deal of this consists in building small type funnels for tugboats and mine sweepers, although stacks as large as 9 feet in diameter and 40 feet long have been fabricated for freight ships. A 10-ton Milwaukee traveling crane is used to handle material in this shop, while two jib cranes facilitate the work of punching plates by holding them in position.

Since completion, the boiler shop has supplied all the boilers necessary for ships constructed in the yard, and in addition has turned out boilers for the Downey Shipbuilding Corporation, Texas Company, Standard Oil Company, Providence Engineering Corporation, and others.

Equipment

The same difficulty of getting the desired equipment during the war period was experienced here as elsewhere, but practically all of the machines essential to good boiler work have been installed. The entire machine installation is of the most modern type, and the crane equipment is exceptional.

A list of machines includes: One 8-foot radial Ridgeway drill; one 6-foot radial Ridgeway drill, both manufactured by the Niles-Bement-Pond Company; one 21-foot Niles-Bement-Pond plate planer; two Garvin turret lathes; one Hurlbut-Rogers staybolt cutter; three Acme screw machines, one of which is of the double type; one Morgan 100-ton flanging press; one Morgan 100-ton, 12-foot gap hydraulic bull riveter; one Morgan 100-ton, 6-foot gap hydraulic bull riveter; one 1,500-pound pressure hydraulic accumulator, designed by the engineering department of the Staten Island Shipbuilding Company. One Milwaukee 20-ton traveling crane handles lesser weights, while a two-hook Pawling & Harnischfeger crane has a capacity on one hook of 35 tons and on the other of 75 tons. The latter is said to be one of the largest cranes near New York. The equipment of the shop does not include gang drills, so that a great deal of the drilling must be done with pneumatic hand drills. Tracks are laid to the doors of each of the shops so that locomotive cranes from the yard can handle material until taken care of by the cranes in the shops. The completed boilers are loaded onto special trucks by means of the plant crane and carried on tracks to the docks. If they are to be installed in company ships, they are dropped into place by lighter cranes, while if intended for shipment they are loaded on the lighter.

The foundry, situated within a short distance of the yard, includes a pattern shop, molding shop, core room and casting floors, as well as a warehouse which at present contains about 20,000 patterns of all sizes, both for marine and other castings. The equipment is very complete, and castings up to 20 tons may be made. The capacity of the plant is about 35 tons of castings a day, which are used to supply the Staten Island Shipbuilding Company as well as outside plants. Among others supplied are The Downey Shipbuilding Corporation, Standard Shipbuilding Corporation, Providence Engineering Corporation, Todd Shipbuilding Company, Morse Shipbuilding Company, Vulcan Iron Works, Baltimore & Ohio Railroad and others. Propellers up to 20 feet in diameter can be cast without difficulty. Two complete sets of reciprocating engine castings can be turned out a week in addition to ordinary propeller work.

The two electric cranes, one a 15-ton Milwaukee and the other a 10-ton Whiting, handle castings on the molding floor. On the side floor are one 3-ton Roper Crane Works electric and one 2-ton Brownhoist crane. In the main bay are two 2-ton Yale & Towne jib cranes. The cleaning department has one 4-ton crane and the core room one 2-ton Brownhoist. Two 10-ton locomotive cranes handle material in the yard.

Pneumatic hand rammers, made by the Ingersoll-Rand and the Cleveland Pneumatic Tool Works, are used in forming molds. On the molding and side floors are two sand mixers, one an electric-driven Lystone and the other a belt-driven Willoughby machine. The core room contains a Wadsworth machine for core making and a small slide drawing oven 25 feet by 10 feet 2 inches. This oven has a bottom draft and flue and a duct around the firebox. A 25-foot by 17-foot oven is also installed. Castings are in many cases cleaned in a 16-foot by 16-foot concrete room by a Paxson & Warren sand blast and exhaust system.

Two cupolas supply metal to the floor. One, a No. 6 Whiting, has a capacity of 9 tons an hour, while the other, a No. 3 Whiting, will supply 4 tons an hour, if pushed. Its normal capacity is only 3 tons of metal an hour.

New Ways

As already indicated, there are four ways in the yard, two of which are new, of reinforced concrete construction, 400 feet by 60 feet, while the other two are somewhat smaller but will accommodate vessels up to 3,500 tons. Under the new ways are arranged offices for the foremen and pneumatic tool and rivet storage spaces.

The crane equipment is complete, consisting of six new 50-foot steel derrick towers between the old and the new ways. Each of the towers has four 5-ton electrically operated derricks, so that the largest ways are supplied by eight and the smaller by four booms. Two fitting-out docks on either side of the ways are also taken care of by these derricks, while three dry docks for repair work have a capacity for ships up to 5,000 tons.

The entire yard is laid with track so that material may be handled by locomotive cranes, of which there are seven. Three Industrial Works cranes are all of the same capacity, i. e., 2,500 pounds at a 10-foot radius of the jack beam and 4,730 pounds at a 40-foot radius. The largest of the cranes, built by the Brown Hoisting Machinery Company, has a lifting power of 29,500 pounds at a 16-foot radius, and 6,200 pounds at 50 feet. As the boilers built at the plant are too heavy to be handled by these cranes, they are transported or installed on lighters by cranes supplied by the Merritt & Chapman Derrick & Wrecking Company.

War Output of the Plant

In the period from April, 1917, to March, 1919, the keels of eighteen ships of various types were laid at the

Generated on 2024-09-12 08:06 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Mariner's Harbor yard, as well as a great amount of repair work carried on, both at this plant and at Port Richmond. Repairs included the remodeling of private yachts for war service, the rebuilding of engines and the repairing of two interned German liners which had been disabled by their crews.

Of the eighteen vessels laid down, six were 3,500-ton ships originally intended for the Cunard Line, but were taken over by the United States Shipping Board in the emergency, six were mine sweepers and six naval tugs. The machine shops at Port Richmond supplied all these ships with reciprocating engines, steering engines, condensers, thrust bearings, shafts, etc.; the foundry with all necessary engine castings and propellers, and the boiler shops with Scotch boilers, stacks, uptakes and tanks.

The 3,500-ton freighters built were of Ferris design, 276 feet 6 inches long overall, 42 feet beam, 24 feet molded depth, powered by an 18-inch by 30-inch by 51.7-inch by 36-inch stroke triple-expansion engine of 1,200 indicated horsepower. These engines were supplied with steam at 190 pounds per square inch pressure by two 12-foot 6-inch marine Scotch boilers.

Mine Sweepers and Tugs

The mine sweepers were built according to Navy specifications and were 187 feet 10 inches long overall, 35 feet 4¾ inches beam, 17 feet 11½ inches molded depth, powered with triple-expansion engines, 19 inches by 29 inches by 46 inches, with 30-inch stroke, developing 1,400 indicated horsepower and supplied with steam at 200 pounds per square inch by two Babcock & Wilcox boilers.

At present the Navy tugs under construction are utilizing practically the entire capacity of the yard. Four of them are on the ways now and two in the water being fitted. The first keel was laid in January, 1919, and it is expected that they will all be completed within the year. Specifications for these tugs state that they shall be of the following dimensions:

Length overall	156 feet 8 inches
Length between perpendiculars	149 feet 3¾ inches
Molded beam	30 feet
Molded depth	17 feet 6 inches
Mean draft	14 feet 7 inches
Full load displacement	1,000 tons
Water capacity	12.75 tons
Reserve feed water	17.5 tons
Fuel oil	260 tons
Speed at 1,000 tons displacement	13 knots

They are to be of the single-deck, single-screw type designed for towing at sea and for mine sweepers, the transverse system of framing being used. Quarters for the officers and crew, as well as the stores, are in a raised steel deckhouse amidships.

Triple-expansion engines, 21 inches by 33½ inches by 55½ inches by 42 inches stroke, developing 1,600 horsepower, are being built at Port Richmond for the tugs. Two Scotch boilers, 13 feet 5⅜ inches diameter and 11 feet 2 inches long, are to be installed and will supply steam at 185 pounds per square inch pressure.

Variety of Work Turned Out

Several rather interesting ships have been built by this corporation. Among these is the *War Captain,* a 3,500-ton Ferris-type freighter, which was the first steel ship ever built for Great Britain in the United States. When it was necessary to have a replica of the historic *Clermont* for the Hudson-Fulton celebration, it was left to the Staten Island Company to reproduce the ship from existing models and drawings. In the field of racing motor boats, the *Dixie IV,* built here, held the world's speed record until very recently. A great variety of design has been turned out at the plant, including tugs, barges, ferry boats, racing craft, steam yachts, mine sweepers, freighters and lighthouse tenders and hospital ships.

Housing and Transportation of Workmen

During the war, special arrangements were necessary to transport, house and look after the welfare of the 3,500 men employed by the company. At the beginning of the war no special means for handling men existed, so that the majority of the workers had to be carried back and forth from Staten Island to New York and the Jersey shore in special boats chartered for the purpose. Motor trucks, special cars and trains were run to help relieve congestion, and as rapidly as possible plans were completed for building houses on land not far from the plant.

The personal welfare and entertainment of the men in the yard has been given particular attention. To this end a Y. M. C. A. hut, similar to those in the Army camps, was constructed during the war. It has been used continuously for medical clinics, lectures on timely subjects, athletics and recreation of various sorts.

With its varied activities of ship construction and repair, boiler construction and stack work, reciprocating, steering and auxiliary engines, foundry work and repairs in connection with all of them, it is felt by the officers of the company that the normal operation of the various plants would not be materially affected by the uncertain conditions existing in the shipbuilding industry at present.

Cracked Cylinder Head Repaired by Welding

Six weeks' time and a substantial sum of money were saved in the repair of a cracked cylinder head of the main engine of the steamboat *Highlander,* operated by McAllister Brothers, New York, by welding the broken parts with electrical apparatus. The cylinder was of cast iron, 72 inches diameter, with walls 2 to 2½ inches thick. The bottom head of the cylinder became badly cracked and broken and the owners had figured on replacing it with a new head, but the time and expense required to have a new head cast were saved by welding the head both inside and out, making it practically as good as new. The job was completed in four working days by the Wilson Welder & Metals Company, New York.

Welded Cylinder Head on Steamboat *Highlander*

Generated on 2024-09-12 08:26 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Pioneer Ships in American Ocean Trade

BY F. B. C. BRADLEE

The transatlantic air voyages of the NC-4 and the R-34, recently completed, represent pioneering in the air which is comparable to the hazardous ocean trips of the first steamboats. In a hundred years the United States hydroplane and the English rigid dirigible, now exemplifying the highest skill in air craft building, will be antiquated; and yet they will still stand for an epoch in this new field. From an evolutionary viewpoint, the steamboat Robert Fulton and the one-time huge frigate Great Republic have a similar interest.

BY some people the *Robert Fulton* is considered the first ocean-going steam vessel, since she was propelled exclusively by her steam engine, while the far-famed *Savannah* used her engine only as an auxiliary, holding her paddles on deck in rough weather. In this sense the *Robert Fulton* may be considered the forerunner of the *Leviathan*, or any of our newest vessels.

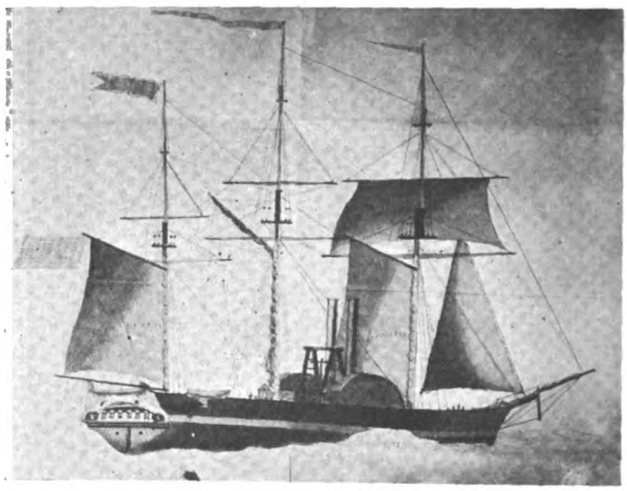
This 750-ton vessel was built for Southern coastwise service by Henry Eckford, New York, in 1819 for David Dunham & Company. The hull was 158 feet long, 33 feet beam and 15 feet depth of hold. Her engine, known as the "cross-head" or "square" type, built by the Allaire Works, New York, had a 44-inch cylinder with 5-foot stroke. Two copper boilers were installed forward of the engines.

On April 20, 1820, the vessel left New York on her first voyage and plied regularly until 1825, when, owing to indifferent financial results, she was sold to the Brazilian Government and the engine taken out.

The *Salem* (Mass.) *Gazette* for May 30, 1820, gives the following quaint account of the vessel's first trip:

> This elegant ship having arrived at Havana, permission was solicited from the authorities of the Island to enter free of port charges, which was promptly and honorably granted . . . she was visited by all the dignitaries of the place. . . . The *Robert Fulton* experienced heavy, boisterous weather, head winds and high seas most of the passage.
>
> She was able to work her engine the whole distance except some little time in which they were repairing the buckets of one of the wheels. . . . The ship proceeded to N. Orleans on the 10th instant.

On this route the time of the *Robert Fulton* averaged 4 days from New York to Charleston, 4 days from Charleston to Havana, and 3 days from Havana to New Orleans.



Robert Fulton, Built in 1820

Other Coastwise Steamers of the Period

In 1837 the Southern Steam Packet Company, owned by Charles Morgan and others, inaugurated a coastwise service between New York and Charleston, S. C. The *Home*, the *Columbia*, the *New York* and the *Neptune* (200 feet long) were used on this line. These boats, with a capacity of about 550 tons, were not steamships in the usual sense of the term, but resembled the Long Island Sound steamboats, except that they had masts and sails and their guards did not extend so far forward and aft of the paddle wheels. The *Home* was wrecked on Cape Hatteras with the loss of nearly 100 lives on October 9, 1837. The other vessels ran for two or three years, and then in the summer months only, and were finally withdrawn from service because they could not stand up under the shocks and strains of the heavy weather.

Another type of construction is shown in the *St. Louis*, a 615-ton side-wheel steamer, 191 feet long, which was built at Perrysburg, Ohio, in 1844 for service on the Great Lakes. With few railroads running west of Buffalo at that time, most of the travel to and from the West was by this route.

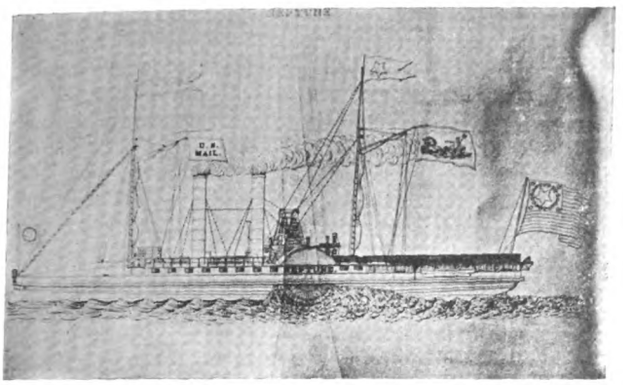
On June 3, 1845, in Lake Huron, the engine of the *St. Louis* was badly damaged when the cross-head gave way. She was bound from Buffalo to Chicago and Milwaukee with over 300 passengers on board. Luckily the brig *Robert Hunter* came along and towed the vessel into the nearest port. The steamer was totally wrecked in Lake Erie in 1852.

In the following year is recorded the completion of the largest full-rigged ship ever built in the United States—the *Great Republic*—which was launched on October 4, 1853. This ship was built by Donald McKay at his new shipyard located at the foot of Border street, East Boston, Mass. Until the coming of the *Great Eastern* in 1860, the *Great Republic* and the steamship *Adriatic* of the Collins line, also American-built, were the largest vessels in the world.

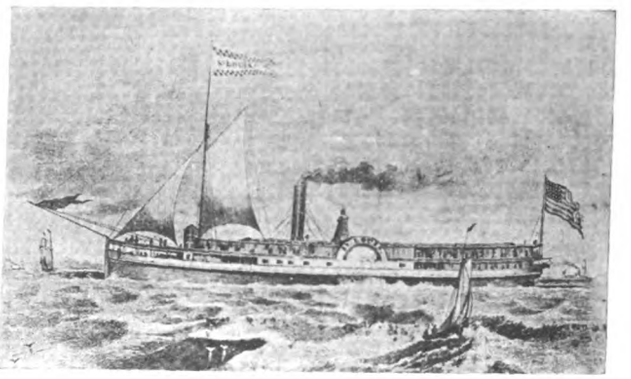
As originally built, she was 4,555 tons register, 355 feet long, 53 feet beam and 38 feet depth of hold. It was more than 200 feet from the deck to the main truck, with yards in proportion. The vessel was fitted with four masts. The spanker mast was 110 feet long and fore and aft rigged. The hull was constructed of oak and pine. As seen from the shore the ship was not particularly different from ordinary clippers, except in length and the great sheer forward from the fore chains to the figurehead. But once on board the visitor was struck with the enormous breadth of beam.

On completion, the *Great Republic*, under command of Captain Lauchlan McKay, was sent to New York to load grain for England. On the night of December 26-27, 1853, when nearly ready to sail, a fire broke out in a building on Front street, near where the *Great Republic*

Generated on 2024-09-12 08:03 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN



Coastwise Steamer *Neptune*, Built in 1837



Lake Vessel *St. Louis*

lay, and the high wind blew the sparks into the rigging of the vessel, which soon caught.

While the fire was yet aloft, Donald McKay, who was on the scene, offered $1,000 to any man who would go aloft and cut away the burning rigging, spars and sails. No one volunteered to take the risk. The masts were then cut away to save the hull, but the fire spread to the ship herself and she was scuttled. Eventually she was sold to A. A. Low & Brother, of New York, and rebuilt by Sneeden & Whitlock, of Greenport, L. I.

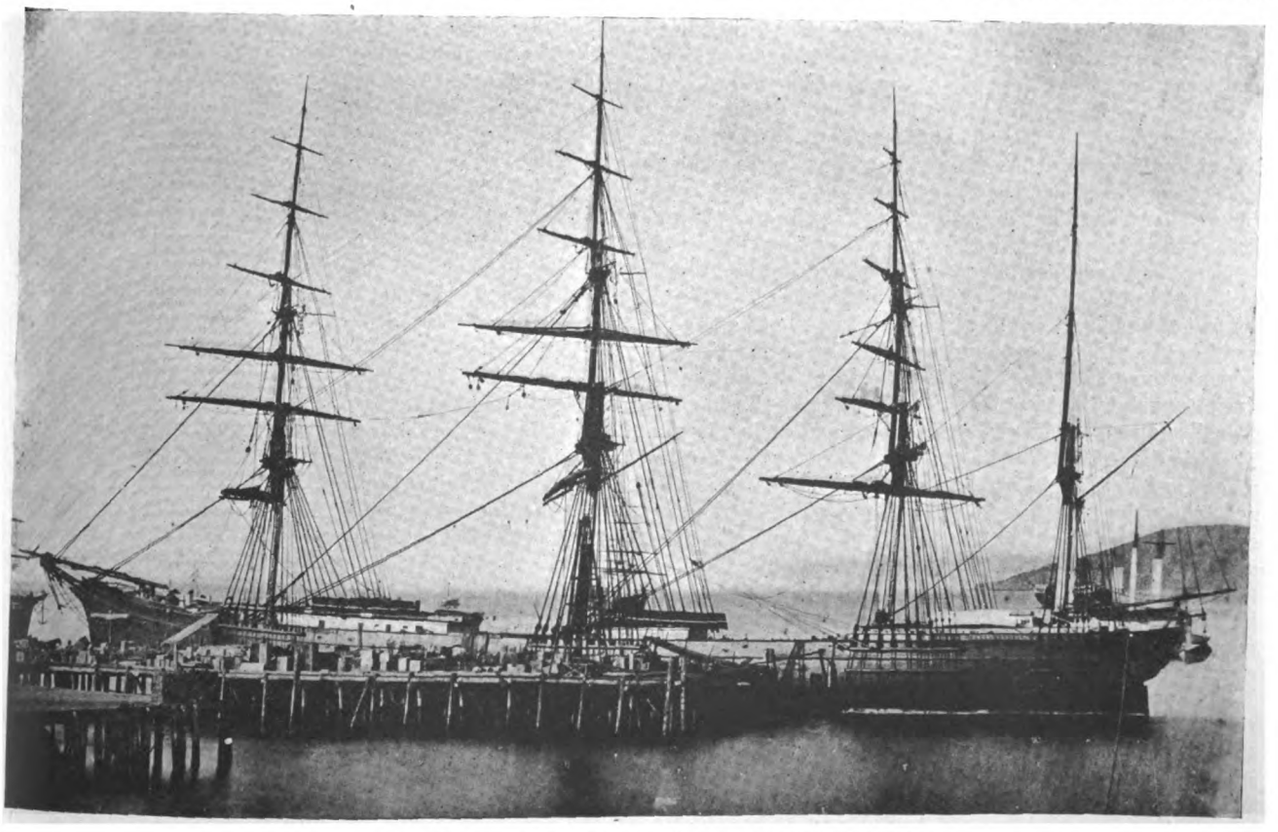
The Great Republic Rebuilt

During the process of reconstruction the *Great Republic* was greatly changed; the spar deck was left off altogether and the masts and sail plan greatly cut down for the sake of economy in handling. By this process her tonnage was reduced to 3,357.

On February 21, 1855, she finally sailed from New York for London on her first voyage, commanded by Captain Joseph Limeburner, who was also part owner. She was off the Scilly Islands 13 days after leaving New York, but it took her three days longer to beat up the English Channel against an east wind. Owing to the vessel's beam and draft (25 feet loaded) the London docks could not accommodate her and she was obliged to lie out in the Long Reach, discharging her cargo into lighters.

The ship was employed as a transport during the Crimean War and in the same capacity by the United States Government during the Civil War. During the intervening period the *Great Republic* made several voyages between New York and San Francisco, one in 1857 of 92 days, or within three days of the record. Her best day's run with a fair wind and all plain and studding sails set is said to have been 419 miles.

There has always been much discussion concerning the *Great Republic's* spanker or fourth mast, some people going as far as to say that when the ship was rebuilt after the fire it was left out so that she really never went to sea with four masts. An old and rare photograph reproduced in this article proves conclusively that this was not the



Four-Masted Ship *Great Republic*, the Largest Vessel in Her Time

Generated on 2024-09-12 08:02 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

case, since the name appears clearly on the nameboard in the shadow of the spanker mast. However, when Captain Luther was a member of her crew in 1862 she then had only three masts, so the spanker mast must have been removed some time between 1855 and that date.

About 1864 or '65, Captain Hatfield, of Yarmouth, N. S., bought the *Great Republic* for himself and brothers. She was loaded with lumber at St. John, N. B., for Liverpool. Here she was sold to the Merchants' Trading Company of that city, and as the *Denmark* was employed in the South American trade until she was abandoned off Bermuda in 1872 with 16 feet of water in her hold. Thus was the end of a vessel as famous in her day as the *Aquitania* is in ours.

A Possible Use for the Shipping Board's Wooden Ships

IT seems to be established that many of the wooden ships built for the Emergency Fleet Corporation are of little, if any, value. As evidence bearing on this point we have the large number laying idle, and the constant recalking and general overhauling that is going on at repair plants. This last is very strong evidence when we consider that all of the vessels are less than two years old. The writer has personal knowledge of two vessels, each of which was recalked twice in a period of less than two months, once during her first voyage and once immediately thereafter. Another vessel was very lucky to be able to end her first voyage in a dry dock instead of on the bottom of the Atlantic.

From numerous instances like the above, it must be concluded that these wooden vessels will not stand engine vibration and something drastic must be done to save any part of the enormous investment now tied up in them. Some are undoubtedly worthless, but a large number are good enough to be altered into sailing vessels, either square or schooner rigged. Wooden schooners have always compared favorably, as an investment, with other kinds of property, many considerable fortunes having been made out of such vessels in the coasting trade.

Let us take for an example the 3,500-ton Ferris ship, having an overall length of about 280 feet. Rigged as a five-masted schooner, this vessel would show a reasonably well-balanced sail plan. The deck framing with continuous girders at the hatch sides would facilitate splicing deck beams to take care of the necessary shifting of hatches. It would be necessary to remove the amidships deck erections. A pump well would have to be provided in the waist, with a donkey boiler in the 'tween decks or in a small house. The last would probably be preferable and is more common. It would be necessary to remove the shaft tunnel in order to gain cargo space. Filling the propeller aperture and the stern tube would be necessary. The windlass should be lowered one deck to give a clear space for handling the head sails. This last change would necessitate lengthening the forecastle to obtain enough crew space. It might be found desirable to build a false clipper bow. That, however, would be largely a matter of looks. Building a house aft for the helmsman would be in accordance with good practice. A hand steerer would be good enough, but utilizing the present steam gear seems more satisfactory.

The present machinery equipment would provide all the pumps and winches needed, and, with care, almost all the additional woodwork could be built of material removed from other parts of the vessel. Practically the only new material needed would be a donkey boiler, masts, spars, rigging, sails and some heavy timber in the decks. The weight saved by the omission of the propelling machinery and the removal of the bridge erection would give a cargo-carrying capacity of about 4,000 tons, as against 3,000 tons for the ship as at present built.

In the above no attempt has been made to go into details, as these vessels, even when built from the same design, have many minor differences. Furthermore, the ports of call and the cargo to be carried would have some effect on arrangements and equipment. This makes any real estimate of the cost impossible, but, roughly speaking, the value of the machinery should nearly pay the bill. This presupposes finding a customer, which seems easy at the present time.

Of course, nobody could afford to pay the price at which the vessels are held by the Shipping Board, but it may be decided that selling a vessel for one-half her cost is more profitable than allowing her to rot.

To the man who buys one of these vessels at a price which, while high, does not include the cost of soldiering and inefficiency, her conversion, as outlined, offers a profitable investment. The proposition should also appeal to any operator who has such a ship on his hands, piling up repair bills, as he could surely reduce his losses and have a fair chance of making some profit.

A SHIPBUILDER.

Pacific Coast Shipowners Propose a Merchant Marine Policy

THE Shipowners' Association of the Pacific Coast, at a special meeting of the board of directors, held on July 3, adopted the following resolution: Resolved, That the policy set forth below is endorsed by this association as the merchant marine policy that should be adopted by the Government of the United States of America:

1. Shipyards should be released promptly from government supervision and permitted to accept any orders obtainable, either foreign or domestic.

2. The Shipping Board should cease building merchant ships when present contracts are completed.

3. The Shipping Board should sell all of their wooden ships to either Americans or foreigners at the best price obtainable.

4. The Shipping Board should offer their steel ships for sale to American citizens at the world's market price, giving due consideration to the competitive conditions. The great number of Shipping Board boats should not be dumped on the market at one time and the price should not be cut or allowed to fall below the building prices of foreign yards.

5. In the meantime, pending sale of vessels, they should be chartered to American citizens at market charter rates obtainable in the different trades, thus making it possible for charterers to use American tonnage on equal charter rates with foreign tonnage.

6. Entire freedom of action should be extended to private owners and charterers in choosing routes and fixing rates of freight and passage in competition with foreign tonnage and supply and demand upon particular routes.

7. Provision should be made so that shipowners would have assurance from the government that it would not itself operate other tonnage for its own account on same routes on which private owners or charterers are operating adequate service to take care of the requirements of the trade.

8. The present operator's and manager's plan should be continued upon unremunerative routes or upon new

Generated on 2024-09-12 08:02 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

routes desirable for extension of foreign trade until such time as those routes build up to the point where private owners and operators are willing to buy or charter American vessels for that service.

9. All coastwise trade should be restricted to American-owned and American-built vessels.

10. American steamship companies should be required to obtain a charter from the Federal Government, which shall exercise close supervision over their capitalization, stock issues and bonded indebtedness. A statute should be enacted revising the mortgage law so as to constitute a mortgage the first lien on the vessel, subject only to liens for salvages, general average and the wages of seamen, thus making vessel mortgages attractive to investors.

11. The compensation for carrying mail in American bottoms should be increased in order to encourage the establishment of mail-carrying lines, such compensation to be adapted to speeds economically practicable in the various trades.

12. Fuel depots, both oil and coal, should be established upon the various trade routes, such depots to be owned or controlled by American interests.

13. All jurisdiction of municipal, state and territorial control over vessels in foreign trade should be eliminated.

14. The Shipping Board recruiting service should be continued on a basis which will assure shipowners an adequate supply of officers and seamen for the future development of the merchant marine.

15. Carriage of cadets or apprentices, both in the engine room and on deck, on all vessels, government or private, in foreign trade should be compulsory and graduated wages should be fixed.

16. The length of service required to obtain an able seaman's certificate should be reduced and all applicants should be required to pass an examination before receiving certificates.

17. A naval reserve should be created, whereby the navy will pay a graduated retainer to all officers and men on deck or in the engine room.

18. Measurement for tonnage should be revised to correspond with British rules, in order to equalize charges based upon tonnage throughout the world.

19. United States steamboat inspection rules for boilers, machinery and hulls, also for deck and life-saving equipment, should be revised along the same lines of British inspection rules.

20. United States coasting laws should be extended to all American possessions.

Work of American Bureau of Shipping Commended by Edward N. Hurley

ONE of the last official acts of Edward N. Hurley before retiring as chairman of the United States Shipping Board was the writing of a letter commending the work done by the American Bureau of Shipping, in which he referred to the development of this bureau as extraordinary. "One of the greatest needs of the future," said Mr. Hurley, "for the proper maintenance and development of an American merchant marine is a strong organization operating on the lines of your bureau."

The text of the letter follows:

Mr. Stevenson Taylor, President,
American Bureau of Shipping,
New York.

DEAR MR. TAYLOR:

Your letter of July 25 outlining the growth and development of the American Bureau of Shipping during the trying period of the last two years, and also giving expression to your opinion and ideas of the needs of the future, is to my mind a splendid statement.

The data you give are interesting and illuminating, and it would be of very great benefit to have the facts in relation to your organization, its work, growth and development, and its prospects more generally disseminated, not alone among shipping men, where the problem is understood, but throughout the country. It is doubtful whether the public generally appreciate how very important an organization such as yours is to the maintenance and operation of shipping, but it is needless for me to say to you that it is one of the most necessary factors in the successful operation of shipping.

The development made by your bureau is extraordinary, both in personnel and in the character of the work done, and it is beyond question that one of the greatest needs of the future for the proper maintenance and development of an American merchant marine is a strong organization operating on the lines of your bureau and developed to meet the needs as outlined in your letter.

In conclusion, I feel that I am warranted in saying that you will have the sympathetic support of the Shipping Board toward the end of developing your organization as you have outlined the plans in your letter.

Very truly yours,
EDWARD N. HURLEY,
Chairman.

Mr. Taylor, in his letter to Mr. Hurley, gave the following figures from the records of ships classed by the American Bureau of Shipping since its recent organization:

Year	Wood	Steel	Composite	Concrete	Total Gross Tons
1916	164	80			216,935
1917	189	34			259,907
1918	102	101	1	12	526,483
1919 (6 months).....	111	184			1,045,314
German and Aux.....	1	53			302,879
United States Navy...	0	36			28,800
	567	447	1	12	2,380,318

Total ships, 1,027.

"When the United States entered into the great war," wrote Mr. Taylor, "and the Shipping Board started the building of ships, shipyards and facilities connected therewith, this Bureau had materially increased its staff and resources.

"On May 10, 1918, it was ordered by the Shipping Board that of all contracts after that date for steel ships there should be 75 percent passed by this Bureau and 25 percent by the British Lloyds Registry.

"At the time of the signing of the armistice we had received about 70 percent, but the cancellations following the armistice have reduced our proportion of steel ships to 62 percent, a situation that could not, in our opinion, have been avoided. We feel, however, that the time has come when every American support possible should be given to our American classification society, particularly the full and undivided support of the United States Government."

Expressing the opinion that "an American merchant marine can be truly American only when every element that enters into it is American," Mr. Taylor points out that the American Bureau of Shipping has ample facilities and equipment for the survey and classification of all ships built in the United States. "We believe," he said, "that the time is now at hand when the Shipping Board should not permit vessels built under its direction to be classed by a foreign society. We appreciate your efforts as chairman of the Shipping Board in strengthening and upbuilding the American Bureau of Shipping, and we have every confidence that the Shipping Board will now adopt the policy of building all of its future ships under the classification of this society, to the end that this American classification society may be able entirely to fulfill its important function in the development of a truly American merchant marine."

Generated on 2024-09-12 07:53 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Shall We Build Our Marine Terminals for the Future or for the Past?

BY JAMES A. SHEPARD*

MANY of the seaport cities of the United States and Canada have either in process of building or projected important extensions to their marine terminal facilities. A recent estimate in the columns of a well-informed publication devoted to terminal engineering places the aggregate cost of these proposed improvements in excess of $100,000,000 (£20,500,000).

That the completion of these enterprises will have an important bearing not only upon the volume of water-borne commerce of these cities, but also upon the cost of handling and consequently the ultimate cost of many necessities, admits of no question. Potentially, the improvement of these important facilities for transportation represents one of the great forces on which we must depend to stay the rising tide of living costs.

Improved Terminals Generally Approved

The people of the country generally, realizing their dependence upon higher efficiency in transportation and also the necessity for the relief which it may bring to them, have generously voted or approved, as the case may be, the large expenditure already authorized and will continue to favor similar expenditures so far as needed. But they are not in a mood to add to their present burden of high living costs and taxation, except for facilities producing such pronounced improvement over present conditions as only the most serious and concentrated efforts of the engineering profession in wisely planning and equipping these terminals can accomplish.

With our present extreme costs for every kind of labor, and with no prospect for the future, except a more acute stage of the difficulty, but one resource remains: we must requisition at once every mechanical expedient which will enable us to apply our high-priced labor more scientifically and thus produce for each dollar expended as much or more than was produced under pre-war conditions.

Responsibility Rests on Engineers

Upon every member of the engineering profession, no matter which of its various branches he practices, rests an important responsibility. The farm, factory, mill, mine and means of transportation must utilize through mechanical means the forces of nature, which are still relatively cheap for every possible process formerly performed manually, because human muscle has become unable to perform the amount of work required by modern conditions and unwilling to perform in a toilsome manner work for which mechanical power and mechanical appliances are far better suited, as well as more economical.

The time is not opportune for an extended study of the causes which have contributed toward a situation in which certain features of transportation are highly efficient while others are performed by rudimentary methods. The fact is, however, so generally recognized as to justify no argument or consideration except that necessary in the application of a remedy.

The annual charge which must be and therefore is borne as a part of present living costs because of the inefficient methods in certain processes of transportation, while generally comprehended, is vastly underestimated.

We are passing through a process in transportation similar to that heretofore encountered in industrial processes; for years the actual cost for manually handling the product through the factory was grossly underestimated because it was accounted at the bare cost of the labor expended, no account being taken of the incidental costs occasioned by slow turnover, restricted production and the whole long train of incidental expenses now directly traceable to the inefficient methods of handling formerly employed.

Economic Value of Mechanical Handling a Matter of History

Industrially the enormous economies effected by mechanical handling are now a matter of history and the money value of the process has been proved by countless balance sheets. It only remains to apply the lessons learned under the roof of the factory to the railroad or marine terminal; the problems are identical. The results obtainable by identical treatment cannot successfully be called into question when applied to transportation.

Mechanics is one of the exact sciences; mechanical operations function perfectly only when all of the parts of a given mechanism are arranged to co-operate according to their own fundamental laws, hence it happens that, while the problem of mechanical handling in industry and transportation are identical economically, there are certain differences mechanically. The machine which performs perfectly a certain function in the factory may be either entirely unsuitable for a marine terminal or applicable only when greatly modified.

Market for Specialized Apparatus

We have not progressed far in identifying and prescribing these mechanical modifications because there has not been heretofore the necessary incentive for active study of the situation, and those who were potential users of mechanical handling equipment in transportation have not provided a market for the specialized apparatus required.

The gradual process by which the development of efficient methods and machinery in other divisions of industry has taken place is not applicable at this time, because we must have results in the shortest possible length of time.

Lack of opportunity for deliberate and careful decisions may lead us into some mistakes; that is perhaps inevitable, but no consequences can be so serious in their effect as failure to make adequate and positive provisions in all marine terminals which are now being constructed or projected for complete mechanical handling of cargo throughout every stage by the most rapid and efficient processes which have been devised.

Terminal Structures Must Be Adapted to Mechanical Installations

In the construction of marine terminals, as in practically all other works in which mechanical appliances are to be, or may be, employed, provision must of necessity be made in the size, strength, character and sometimes the details of the main structure for the particular type of machinery to be employed. The most difficult prob-

* Vice-president and chief engineer, Shepard Electric Crane & Hoist Company, Montour Falls, N. Y.

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

confronting those persons having the responsibility for the design and construction of marine terminals at this time is what provisions should be made in the terminal structures to facilitate the application, when desired, of the most efficient mechanical cargo-handling equipment.

Recognizing the necessity for an answer to such a question before rapid progress could become possible in any programme for higher efficiency in cargo handling at marine terminals, and the great loss in efficiency which must follow to the country at large should there be failure to find and apply the answer, the writer, in collaboration with several associates, has conducted an investigation of the subject extending over many months and has also canvassed the opinions of many engineers occupying a position which qualified them to judge intelligently.

It would, of course, not be proper to assume that the conclusions reached are infallible, but they are here offered in the hope and belief that they will be welcomed by many who have been unable to secure more authoritative data on the subject.

More than $100,000,000 (£20,500,000) is available for improving the marine terminals of the country; it is of vital importance to all that it should be productive of facilities which will contribute in the highest degree toward bringing the necessities of life within reach at the lowest possible cost. In whatever measure the money is spend for developments which fail to answer to the present need it will have been misspent; instead of becoming an asset, it falls among our already long list of liabilities.

Features Which Are Considered Essential and Should Therefore Be Incorporated in the Design and Construction of All Marine Terminals Intended for General Cargo, in Order to Facilitate the Installation of Cargo-Handling Machinery

Cargo as handled at marine terminals is divisible into four general classifications, namely:

Bulk Cargo.—Covering loose grain, coal, ores and similar materials in quantity sufficient to form an entire ship's cargo.

Bulk Cargo in Packages.—Covering grain, flour, sugar, cement and similar materials in sacks or other similar uniform packages in quantity sufficient to form an entire ship's cargo.

Heavy Cargo.—Covering steel bars, plates, pipe, fabricated structural steel, pig iron, boilers, heavy machinery and other heavy articles in considerable quantity or in units or packages of sufficient weight to justify or necessitate their handling on an open pier equipped with heavy cranes or by floating cranes.

General Cargo.—Covering all commodities not otherwise classified in bundles, boxes, barrels, sacks, bales or unpacked, the weight of individual pieces or packages not exceeding ten tons.

It is assumed that the greatest uncertainty as to method applies to the mechanical handling of general cargo, also that the greater portion of the terminal development projected is for the purpose of handling general cargo. For that reason the following comments are made, applicable to general cargo only.

Quay or Pier

With either the quay or pier type of marine terminal intended for handling general cargo, a portion of which must be received or dispatched by railroad, it is considered essential to provide two independent railroad tracks between the bulkhead and transit shed, arranged with crossovers at suitable intervals. Sub-structure construction should always provide for such tracks, whether immediately applicable or otherwise.

Handling Between Ship and Pier

For rapidity and all-around economy, the semi-portal type of jib crane, electrically operated with direct current, or one of the several modifications of this type of crane, operated independently or in connection with the ship's winches, should be provided for, whether immediately applicable or otherwise.

Sub-structure construction should, therefore, be made suitable for a gantry track rail about three feet back from the outer face of the bulkhead and for two-wheel loads on such track, in addition to all other loadings of not less than 60,000 pounds, spaced not to exceed 25 feet center to center.

The transit shed should be arranged for carrying a runway girder and track rail along its face when of two-story construction, arranged for a full clearance of at least 12 inches from the center of the rail to the face of the building and having a gage with the gantry rail along the bulkhead, measured horizontally, of not less than 26 feet. Provision should be made for two-wheel loads on such track, in addition to all other loadings, of not less than 35,000 pounds and spaced not over 18 feet center to center.

When the transit shed is of one-story construction the runway may be placed on top of the building column, the total horizontal distance from the face of the transit shed to the bulkhead being maintained the same as for two-story shed.

Construction of Transit Shed

The clear height of the transit shed should not be less than 24 feet, within which height and bounded by the inner face of the building columns there should be no knee braces, leader pipes, sprinkler pipes, projecting doors or door-operating mechanism, so as to permit the necessary clear room for the installation of some one of the various types of traveling cranes available for handling cargo within the building.

The carrying capacity of columns should be made sufficient, in addition to all other loads, for two-wheel loads along each outer row of columns and four-wheel loads along each row of inner columns of at least 13,000 pounds each, spaced not over 12 feet apart.

It is considered preferable to employ two rows of interior columns dividing the interior of transit shed into three bays.

No railroad tracks should in any event be placed within the transit shed, as they represent a severe interference with interior handling of cargo and are also wasteful of transit shed floor area.

Transit Shed Doors

It is considered advisable to provide doors affording a full opening between all side columns of the pier shed. A height of door openings of about 18 feet will be ample.

The practice of providing doors in alternate panels of the pier shed will affect adversely any system of mechanical unloading or handling of cargo.

The doors should be of a type which will not conflict with the crane runway or interfere with the passage of cranes either inside or outside of the pier building.

It is a simple matter to construct a transit shed so that cranes may be employed at any time their use appears to be advisable. As has been the case in industrial buildings, pier buildings will have a much greater permanent value if they present no obstacle to the employment of

Generated on 2024-09-12 08:00 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

machinery as the art of cargo handling advances to the point where its use is considered essential.

It is thought that cargo masts will prove to be of little or no value in any comprehensive scheme of mechanical cargo handling and that with the development of the art they will fall into complete disuse.

Duplication of Mechanical Units

It will be well to bear in mind the fact that the foreign commerce of neither the United States nor Canada is fully developed. As a consequence, certain ports which specialize in certain classes of cargo may within a few years experience a decided change in the character of cargo which must be handled. The fact that a certain type of machinery is not now necessary presents no assurance that it will not within a few years be required. A wide variety in the character of the cargo to be handled will demand variety in the handling equipment of many piers, in order that specialized and consequently efficient equipment may always be available when needed.

When the various sources of economy effected by mechanical handling of general cargo receive full consideration there will be no room for doubt that mechanical equipment, even if only used at comparatively long intervals, is more efficient than any alternative. The ax was doubtless the original wood-working implement and was adequate for every operation performed by the original wood workman, from felling the tree to splitting, shaping, smoothing, cutting to length, etc. With the advent of the saw and plane and all of the other various modern refinements in wood working, it became necessary (and efficient) to select for use from the various tools in the workman's kit such as will be immediately suitable, the remainder meanwhile lying for the time unused.

We are in the "ax" stage in handling general cargo. It is to be hoped that as we progress complete reconstruction of our harbor structures will not become necessary before we can use the other tools which must finally be added to the "kit."

Broken Web of Six-Ton Crank Shaft Repaired by Welding

AN unusual welding repair job, which required high engineering ability and skill of a high order to handle successfully, was that of a six-ton crank shaft, broken through the web as shown by Fig. 1.

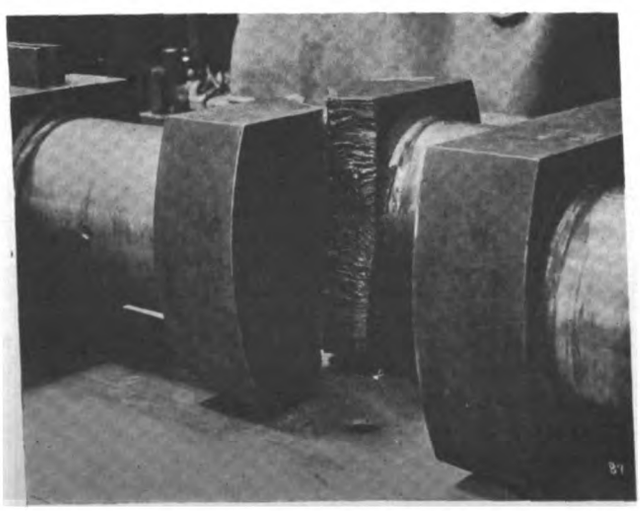


Fig. 1.—The Broken Web

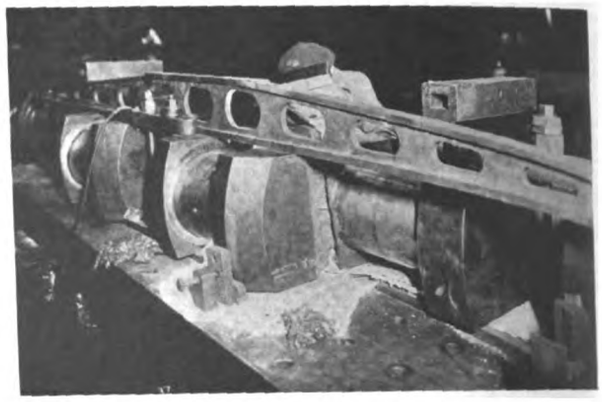


Fig. 2.—Method of Lining Up the Shaft

This shaft was part of the equipment of the Houston Ice & Brewing Company, Houston, Tex., but as repairs could not be made in that section the broken shaft was shipped to the Jersey City, N. J., plant of the Vulcan Iron Works, where it was repaired by welding by the Wilson Welding Repair Company, using a plastic arc outfit.

The greatest difficulty was insuring proper alinement of the shaft at the conclusion of the work. The shaft was clamped to the table and lined up as shown in Fig. 2. The welding proceeded after the metal at the break had been chipped out to insure a clean surface for the added welding metal to fuse with.

The job as finished is shown in Fig. 3. When the welding was finished the shaft was tested in a large lathe and found to be entirely true from end to end.

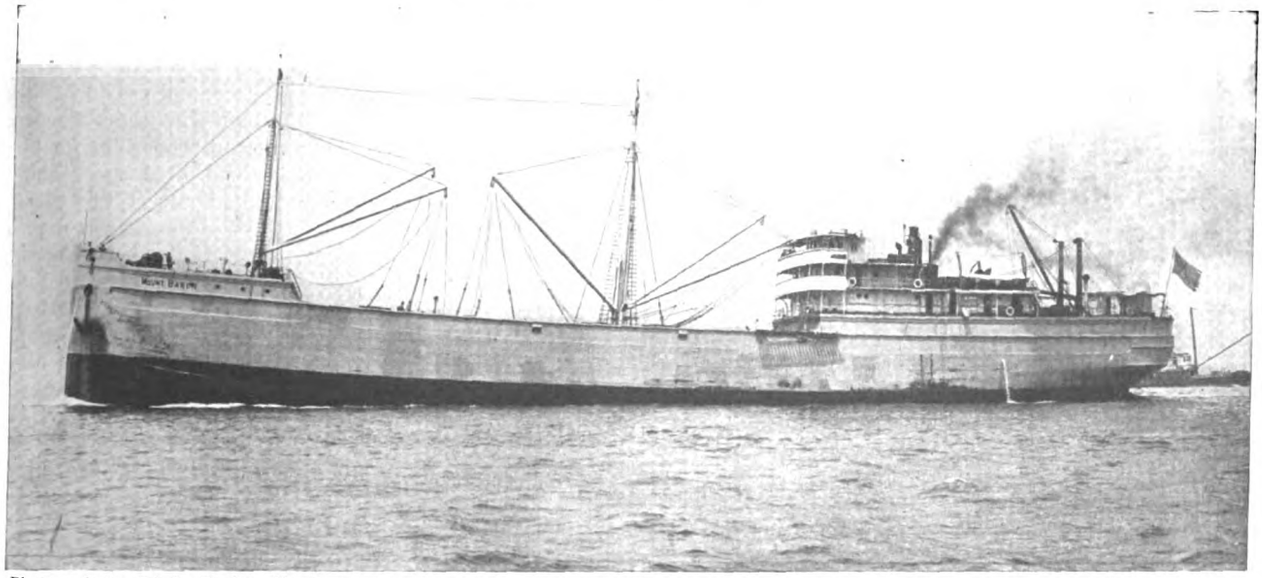
Fig. 3.—The Completed Weld

Motorship Mount Baker

THE Globe Line, 39 Broadway, New York, which operates steamship lines from New York, Philadelphia, Norfolk and San Francisco to east and west coast ports of South America, has augmented its fleet by the addition of two motorships and two motor schooners. The motorships, one of which, the *Mount Baker*, is illustrated on page 625, are sister ships, each 285 feet long, 44 feet 7½ inches extreme beam and 26 feet molded depth, built by the Supple-Ballin Shipbuilding Corporation, Portland, Ore.

The hulls are of wood built according to the new type of construction designed by F. A. Ballin, with double diagonal planking and steel plate topsides. With a gross

Generated on 2024-09-12 08:00 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN



Photograph by Edwin Levick, N. Y.

Motorship *Mount Baker* Has a Deadweight Carrying Capacity of 4,600 Tons

tonnage of 2,909 and a net tonnage of 2,433, each vessel has a total deadweight carrying capacity, including fuel and stores, of about 4,600 tons. This is nearly 25 percent greater than vessels of a similar size built according to conventional designs.

The *Mount Baker* is equipped with two sets of 8-cylinder, 500-horsepower Winton Diesel-type heavy oil engines, with cylinders 12 15/16 inches diameter by 18 inches stroke. The vessel has a sufficient fuel capacity to give her a steaming radius of 15,000 miles on a fuel consumption of 30 barrels, or 4 tons, of oil per day.

For this type of machinery the engine room crew includes only four engineers, three oilers and one donkeyman. It is necessary to have only one engineer and one oiler on duty at any time. Figures recently published regarding the initial voyages of the sister ship *Mount Hood*, which is identical in every respect with the *Mount Baker*, showed that the fuel consumption was 0.0021 gallons of oil per cargo-ton mile.

No trouble from hot bearings, lubrication or weakness of parts was reported from this vessel after an 8,000-mile voyage to South America and back.

Photograph by Edwin Levick, N. Y.

M. S. *Mount Baker* on her Trial Trip; Stern View

Activities of Todd Shipyards Corporation During the War

DURING the period that the United States was at war the Todd Shipyards Corporation, in its repair yards in New York harbor, handled the tremendous total of 250,000,000 tons of shipping. A review of the corporation's war activities both on the Atlantic as well as on the Pacific is of more than ordinary interest, as its contributions to the war-winning resources of the country were of unusual value.

The first convoy of transports to carry men of the American Expeditionary Force to France included merchant vessels that had been converted into troopers by the Robins Dry Dock & Repair Company, Brooklyn. The rehabilitation of many of the big German liners that were wantonly damaged by their officers while interned here was handled by the Tietjen & Lang Dry Dock Company in Hoboken. The Tebo Yacht Basin Company in Brooklyn built for the Navy Department nine mine sweepers, fitted out for scout patrol service the yachts of millionaire patriots, and engined many vessels built by the Emergency Fleet Corporation. The product of the White Fuel Oil Engineering Corporation, a highly efficient system for the burning of fuel oil, was installed on scores of vessels, and the Quintard Iron Works, which rendered valuable service during the Spanish-American War, turned out marine engines both for the ships of our allies as well as for our own hulls.

These five companies are the New York subsidiaries of the Todd Shipyards Corporation. On the Pacific coast, at Tacoma, the Todd Dry Dock & Construction Corporation was awarded contracts for the construction of twenty-four 7,500-ton steel freighters and three scout cruisers. At Harbor Island, Seattle, the plant of Todd Dry Dock, Inc., was kept busy night and day on repair work.

The Robins plant had made a record for ship conversion in 1913, when there seemed to be a possibility of trouble with Mexico. The War Department at that time turned over three large merchant vessels to be converted into troop and animal transports. This conversion, which was almost a rebuilding, was completed on all three ships in the unprecedented time of four days and nights, and both army and navy officers expressed their astonishment that

Generated on 2024-09-12 08:00 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

any plant should have the organization and capacity to finish a job of these dimensions in such a short period.

It was no surprise, therefore, that the War Department should turn first to Robins when a bigger emergency arose in 1917 and send to the Erie Basin plant the first ships to be made ready to carry troops to France. The work was done in record time and the newly fitted transports sailed out of New York harbor in the first convoy. Robins converted nearly a score of vessels into transports, and when all work of this character was finished started out to make amazing records for big and unique repair work.

The demand for tonnage was never more acute than during that period, and vessels never intended for Atlantic service were sent from the Great Lakes to Erie Basin to be lengthened. The *George E. Warren, L. V. Stoddard* and the *George Hawley* were some of the vessels changed in this way. They were also converted from freighters into bulk oil carriers and oil fuel burners. The reconstruction of the *Curaca,* the repair and practically rebuilding of the torpedoed *Fred R. Kellog* and the more recent repair of the *Lord Dufferin* are Robins jobs that have interested the whole world.

There is no bigger ship in the world than the *Leviathan,* and it was appropriate that the work of transforming this marine monster into a transport should be assigned to the Tietjen & Lang plant. The same yard handled the *George Washington,* the *President Lincoln,* the *Mount Vernon,* the *Hamburg* and most of the German ships that were impressed into the country's service.

Many of these vessels had been seriously damaged by their German crews. The damage extended to practically every part of the ships, from the treating of a rope with hydrochloric acid so that it would snap immediately weight was applied, to the smashing of cast-iron cylinders, some of which were more than nine feet in diameter. Hammers and other foreign objects were found in the machinery where they would do the most damage once the engines were set in motion. Connecting rods, boiler stays and piston rods were found sawed halfway through; boilers needed renewing because they had been ruined by dry-firing. Ground glass was found in oil cups, gun-powder in the coal, metal life rafts had been punctured so that in an emergency they would be more likely to prove "death" rafts.

There were other evidences of vandalism, but, great as the damage was, it was not enough to baffle the ingenuity of the American experts called to investigate and suggest means to restore these ships to usefulness, one of whom was George J. Robinson, vice-president of the Robins Company. The damage in each case was discovered and in record time was repaired, and when sent to sea for a 48-hour test run under full power, American engineers demonstrated that their skill had triumphed over these acts of diabolical sabotage, and not only so, but these ships showed greater efficiency after their restoration than they had exhibited under German operation. Department heads at Washington computed that the repair of these ships had saved twelve months in time, enabled us to transport at least 500,000 troops to France and effected an economy estimated at $20,000,000 (£4,100,000).

The *Saratoga,* sunk while carrying troops, was salvaged, renamed *Mercy* and converted into a hospital ship. The *El Rio* and *El Dia,* renamed *Housatonic* and *Roanoke,* were converted into mine layers and sowed more mines than any other two layers. The Belgian relief steamer *Imo,* which caused the Halifax disaster in 1918, came to the Tietjen & Lank plant with a thousand holes in her hull and was made as good as new in record time. The repair of the stern of the United States destroyer *Trebble* was another record war job.

The mine sweepers built by the Tebo Company were 188 feet long, 35.5 feet beam, 18 feet deep, and provided with engines of 1,400 indicated horsepower. Eight wooden hulls of standard design for 3,500-ton steamships for the Emergency Fleet Corporation of the United States Shipping Board were engined and fitted out at this plant. Scores of yachts were transformed into scout patrol vessels, and at the present time some of them, the *Noma, Corsair, Aphrodite, Atlantic,* are being reconverted to their pre-war condition.

Self-propelled oil barges for the Navy Department are now under construction, and, bearing in mind that in 1917 Tebo's consisted of nothing more than three wharves, a storehouse, a small office and two small dry docks, it has made an enviable record.

Oil, more than any other fuel, proved its worth in the big war, and the White Fuel Oil Engineering Corporation contributed still more to the resources of the government by manufacturing and assembling oil-burning equipment.

For more than half a century the Quintard Iron Works has held a prominent place among the industries of New York, and from its origin in 1865 has made a prominent feature of the building of marine engines. During the war fourteen 1,400-indicated-horsepower engines were built for the United States Navy, as well as other engines for the Shipping Board, the Canadian Government and for shipowning corporations.

These works have pioneered in the line of improvements in marine engines, with the result that the Navy Department, which always wants the best in equipment, has been a large user of the Quintard product.

When the armistice was signed the plant of Clinton Dry Docks, Inc., in Brooklyn was almost completed, and today, with three sections of the 8,800-ton floating dock in service, has established itself as an effective ship repair yard.

In the latter part of 1916, when plants were much needed in the Puget Sound region for the building of steel vessels for the Emergency Fleet Corporation, William H. Todd visited Tacoma and selected what, to the ordinary eye, appeared to be a stretch of useless swamp. In fact, the site was under about eighteen feet of water.

A big fill was naturally required before plant construction could begin; but, once filled, the plant grew apace, and with it ships, for contracts had been taken for the construction of twenty-four steel steamers, 396 feet long, 53 feet wide and 29 feet draft loaded, of 7,500 tons capacity, for the United States Shipping Board and also three scout cruisers for the Navy Department.

The keel for the first vessel was laid in September, 1917, and a week later work was begun on the second, and from that time on the yard kept turning out fine, big steel ships to help Uncle Sam win the war. In one year the Tacoma plant launched more than 67,500 tons of shipping and was the first Pacific coast yard to launch a steel freighter in 1919.

Such, in brief, is the war record of the Todd Shipyards Corporation—a record made possible by the spirit that prevails in all the Todd plants and the inspiration given by President Todd. Through it the yards have attained a morale that has resulted in the harmonious cooperation of all departments and the unquestioned loyalty of all employees. That same morale will prove just as effective, just as valuable, now that peace has been restored, as it proved the big factor in the unsurpassed war record of the Todd Shipyards Corporation.

Generated on 2024-09-12 08:02 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Problems in Labor Administration

Elimination of Financial Wastes and Losses in Production and the Promotion of the Well-Being of Workers

BY DWIGHT LOWELL HOOPINGARNER

THE human resources of any business organization require as uniform and consistent a policy as the technical problems of production or service to the public. This is true whether the product of the firm is in the form of concrete material, such as manufactured articles, or in the form of service of a more personal nature. The results secured through the thoughtful administration of the human relations are two-fold: first, elimination of financial wastes and losses in production, and, second, promotion of the well-being of the workers. In fact, the interests of both of these are ultimately identical.

It is a problem of mutual relationships. Both the organization and the individual have standards of attainment which must be met. The whole superstructure of the organization, however, rests upon the individual worker as the basic unit. If he does not work to the best advantage for all concerned, there will be a break somewhere, sooner or later. Man power has come to be the variable factor of chief importance in production, and more and more the differential in favor of any undertaking requiring a body of personnel is being measured by the degree of efficiency and contentment of its group of workers.

Labor Problems Far-Reaching

Many of the problems, moreover, are not confined within the walls of a single plant or industry. To avoid the evil effects on industry of varying standards of labor of similar nature with respect to hours, wages and other conditions of work throughout the various communities is just as necessary as to prevent wasteful practices from disturbing markets and other conditions of trade. With both, wholesome levels of operation must be maintained. Labor affects not only the extent of production, but prices and markets as well. Conditions and standards of work, in addition to involving many of the same principles of harmony that the economic factors themselves do, have a social and human significance that often surpasses their economic importance.

Illustration of how these principles are finding concrete expression to-day is found in the increasing demands pertaining to wages and hours, the various organizations of workers, the desire for industrial enfranchisement on the part of labor, and similar movements. Also, some of the more wide-awake employers, recognizing the far-reaching importance of the human factors, are anticipating the rightful desires of their workers and are co-operating with them to work out plans mutually beneficial.

Fundamental Problems Involved

What, then, are some of the fundamental problems of a specific nature that are involved?

First, there is the very real desire of workers for more of those things in life that constitute a reasonable *standard of living,* or *status.* It is a general desire—a distinctly psychological factor. It is that "something" which brings satisfaction to one individually and in the estimation of his fellows, without which he does not work or produce effectively. In time, without it he often becomes antagonistic. To him it means more than the minimum necessities of mere living, and as such furnishes the *motive power*—power for work and living. Hence, it has a decided economic bearing.

Second, there is the demand of the worker for a *greater share in the responsibility* of the enterprise. This expresses itself in two directions: first, a share in management through shop committees and collective bargaining and other mediums that give a voice in control, and, second, an opportunity for more self-expression in many cases in the work itself. In this connection, also, the worker wants to know more about the company and its work, and wants the company to appreciate his place in the organization and the conditions under which he works.

Third, the workers demand a *greater share in the product of industry.* Sometimes this demand takes the form of a request for increased wages, and sometimes it finds expression in the desire to share jointly in the profits. In either case it arises from the feeling of economic pressure, along with the practically universal desire for a better status, at times possibly not clearly defined, and from the belief that a certain portion of the product is the result of joint effort, without which no one would have this portion of the product to enjoy.

Fourth, the workers desire *improved conditions of work.* First among these is the demand for shorter hours of work. Then, too, healthy conditions of work, elimination of accidents and excessive fatigue and reasonable conditions of housing and transportation are important. In these matters, however, as in all others, the employees desire no expression of a paternalistic nature on the part of the company.

Fifth, reasonable *assurance against unemployment* is considered fundamental by the worker in order to insure him against the inability to meet the necessities of life and enjoy the other benefits which he desires.

The foregoing statements represent the minimum demands of labor which are bringing about more or less acute situations from day to day throughout industry. Failure to adjust these conditions satisfactorily is now costing millions of dollars. Without any one of these desires met the worker feels that enjoyment of the others can be of little permanent avail. In fact, it is through the others that his general desire for a better standard of living, or status, finds its expression and its assurance of realization.

Production and Finance Dependent Upon Demands of Labor

Along with the demands of the workers there must be considered the problems of production and finance which the employer must meet. These require that, in so far as practicable, maximum production be secured at minimum cost. Too often, however, this cost has been figured on the too narrow basis of the material factors alone without recognition of the ultimate identity of interests of employer and worker, with consequent loss to both. There is, then, the problem of *correlating the requirements of production and finance with the reasonable demands of labor* on the common basis of mutual interest.

It is apparent, however, that both the worker and the

Generated on 2024-09-12 08:14 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

employer in many cases are not in a position now to adapt themselves quickly and with the greatest benefit to these changes in conditions. It is necessary that each inform himself of the requirements and opportunities of these several factors of readjustment as they are brought about. There is also, therefore, a further and pressing problem of *education*. The worker needs to have information regarding the facts of sound business enterprise and to prepare himself to assume his share of the responsibility or control of industry effectively and to advance his standard of living appropriately. On the other hand, the employer needs to acquaint himself with the psychology of the worker, his natural feelings and desires, and the requirements for his most productive effort. Each needs to educate himself into the confidence of the other.

INDUSTRY MUST BE CONDUCTED ON A CO-OPERATIVE BASIS

The task of meeting these demands requires the most careful thought in adjusting the organization and methods of conducting industry. Industry must be established and conducted on a *co-operative, and not a conflict, basis.* This is the most fundamental problem of all, upon a workable solution of which depends largely, in turn, the satisfactory accomplishment of the other aims. Co-operation, of course, does not always mean agreement, but it means willingness to work together.

The general administrative machinery required to effect this co-operation is of three types. The first is the *policy determining organization,* the second the purely *administrative organization,* and the third the technical producing or *working units* themselves.

POLICY DETERMINING ORGANIZATION

The *first* of these finds expression in the various types of works or shop committees and collective bargaining with purely workers' organizations. Whether they be based on industrial or craft lines, however, they should be promoted in the belief of the mutuality of interest between both sides, and not with the desire to "strike the best bargain." Honest differences of opinion should be freely discussed and not condemned.

As indicated, these committee or conference units are composed of representatives of both management and workers, with the tendency developing favorably towards equal voting power. Their function is to determine matters of policy on such questions as wages, hours and other conditions of employment. Those questions that are of local significance within a given plant or industry permit of less complex machinery than those of wider importance which affect various communities or industries. Industry as a whole is now confronted with the task of determining the proper jurisdiction and methods of organization for handling these matters. It must also consider how far joint management shall extend beyond matters relating merely to employment and working conditions.

ADMINISTRATIVE ORGANIZATION

The *second* type of organization is that responsible for the administration of the policies determined by the first. It is the department of industrial relations or employment administration. It has, of course, an appropriate voice in the organization that formulates the policies.

This department is the centralized channel for promoting and assisting in handling all matters pertaining to labor relations. It requires a trained staff and specially adapted machinery, organized and equipped to deal with them. Co-ordination of effort under one head is as necessary in caring for the interest of the worker and the interest of the organization as it is in handling the material or financial end of the enterprise.

FUNCTIONS OF ADMINISTRATIVE DEPARTMENT

Some of the more important functions which this department finds necessary to perform are: To develop sources of labor supply that will provide a sufficient number of competent employees; to direct the selecting and placing of employees in the jobs for which they are best fitted; to control questions of transfer, promotion, discharge from the plant, and other adjustments affecting the employee relationships; to administer the work on accident prevention, health and sanitation, training, housing and transportation, and the like; to advise with the department heads concerning their labor difficulties and problems and furnish them with information on labor conditions; and generally to develop within the organization plans for mutual helpfulness that will promote a spirit of genuine co-operation and understanding between the management and the workers.

In carrying out the administrative work on employment relations through a single co-ordinated department, however, care must be taken, as with the policy determining organization, to see that the department heads and foremen have adequate voice in matters pertaining to the work of their departments. In the final analysis, the function of the department of employment relations is to see that the various labor matters are satisfactorily cared for, rather than doing them entirely itself.

One of the most fundamental policies that can be established is the maintenance of an executive council or cabinet to discuss the interrelated problems of labor and production. This cabinet should be composed of executives who are in charge of the technical problems of production, the manager of labor relations, and the executive who is in charge of the problems of general control. It functions in helping to co-ordinate the various phases of labor administration with the operating departments.

CO-OPERATIVE ORGANIZATION AMONG THE WORKERS

The *third* type of organization necessary to effect co-operation is that within the producing or operating units themselves. It expresses itself in improved methods of production for the workers as members of the group, and in stimulating co-operative effort in the group as such. It deals with the worker in his daily round of work, and helps to create a feeling of mutual interest between him and the management.

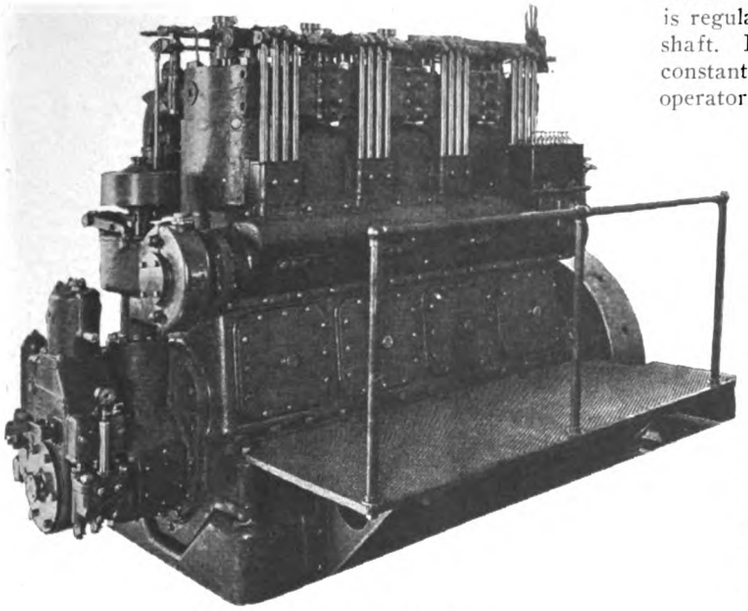
This programme should have as one of its outstanding features personal contact with the employees. The management should keep in touch with the needs and abilities of the employees and their working conditions. There should be a constant exchange of judgment between the department heads and the employment manager to determine the requirements, and to help keep in close contact with the working force. Sympathetic understanding of conditions, recognized in time, will often prevent lack of interest, resignation, or discharge of valuable employees. It is a problem of developing possibilities within the worker not always visible at the time of employment.

Throughout the entire programme of labor administration, emphasis must be placed on the necessity of better adapting the workers to the work, and in many cases the work to the workers, rather than the elimination of workers from employment, in the belief that this in turn not only makes specifically for increased production, but also generally for the mutual advantage of all concerned. Above all, human resources must be conserved, both economically and socially, if production and mutual well-being are to be maintained.

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

The Pittsburgh Marine Oil Engine

DURING the last few years much interest has been displayed by the engineers of this country in the type of high-compression oil engine originally developed in Holland by the *Brons Motorenfabrik, of Appingsdammer,* but better known in America as the Hvid type motor. So much interest has been aroused that from twelve to twenty domestic companies have taken out manufacturing licenses for marine or stationary sets, or else for both. The marine field for this engine includes power for ship's lifeboats, tugs, sailing-vessels, general-service craft, harbor launches, fishing-boats, emergency wireless-plants, and engine-room auxiliary machinery. It may be mentioned that many of the large Diesel motorships turned out by the Werkspoor Company, of Amsterdam,



Pittsburgh Heavy-Duty Oil Engine

use Brons type oil-engines for the electric-lighting equipment with considerable success, so doubtless the Pittsburgh engine will be used in American ships for the same purpose. It operates on the four-cycle principle and is made in sizes of 25 horsepower per cylinder in one-, two-, three- and four-cylinder units, both in the marine and stationary types.

Among the American manufacturers which have entered the marine field with an engine of this type is the Pittsburgh Filter & Engineering Company, with general sales offices at 280 Broadway, New York. This engine, it is claimed, combines the economy of the Diesel principle with mechanical simplicity. It is independent of any carburetor, hot-bulb or plate, spark-plug, high-pressure air-compressor, air storage tanks, fuel-pump or spray-valve. The compression is carried to approximately 500 pounds per square inch, and the motor is started from cold without pre-heating and put under full load in a few seconds. The makers state that it will burn any grade of the cheaper fuels, from kerosene (paraffin) to the heaviest of fuel-oils generally used in motorships, the same fuel serving for starting the motor.

In the design of the Pittsburgh engine, the aim has been to combine simplicity of construction with accessibility. The engine is of the enclosed type, and the designer has adhered as far as possible to the thoroughly tested practice of modern Diesel engines. Not only is the crank case enclosed, but the camshaft bearings, roller-levers and gears run in a bath of oil. The camshaft can be removed by taking off the front cover. Accessibility of the crank-pins is provided by very large openings in the crank-case. Air to the cylinders is admitted through slotted mufflers.

Starting is accomplished by means of compressed air of about 125 pounds pressure per square inch, each cylinder being provided with an air-starting valve. The starting is assisted by compression-relief valves. Starting and relief valve-rockers are mounted on eccentric shafts, and a single turn of the control-lever brings the engine from starting into the running position. This operation of the control-lever also shuts off the fuel to the cylinders during the starting period. Compressed-air for charging the starting-tanks is supplied by a compressor driven off the engine-shaft. The amount of fuel required is regulated by a suitable governor mounted on a vertical shaft. Independent from this automatic regulation of a constant engine-speed, a hand control-lever enables the operator to slow the engine down while running.

The lubricating system is complete and entirely automatic. The arrangement adopted provides for the use of two grades of lubricants for the pistons and bearings respectively. The pistons are oiled by a suitable force-feed lubricator driven off the camshaft. This lubricator has individual feeds and a float-valve for automatically keeping the lubricator filled when connected to an overhead reservoir, no attendance being required.

Main-bearings, crank and piston pins are at all times flooded by a copious stream of cool oil by a plunger pump driven off the engine-shaft. The oil is initially forced under pressure into the main-bearings, and through drilled passages in the crank-shaft into the crank-pins, thence through the drilled connecting-rod to the piston-pin. The oil after leaving the bearings is collected in the crank-pit and flows to a strainer, and from here a small plunger-pump delivers it to a suitable filter. After leaving the filter the oil passes through a cooling-coil and is used over again.

The base or bed-plate is of a rigid box-section cast integral with the crank-pit and seats for main-bearing shells. These shells are of cast-iron, lined with babbitt-metal. The main-bearings are provided with shims for adjustment. The shims are composed of layers of brass firmly held together by a metallic binder. An adjustment of 0.002 inch is made possible by this method.

Open-hearth steel is used for the crank-shaft, and it is forged from the solid; and for all smaller engines, including the four-cylinder size, is made in one piece. The six-cylinder shaft is made in two half units. It is enlarged and tapered at the end to receive the flywheel. The enlarged end also serves as coupling flange for the shaft. Cylinder frame and crank-case for engines, including the four-cylinder size are cast in one piece; for the six-cylinder unit two three-cylinder frames are bolted together. The working cylinder proper, or liner, is of plain cylindrical form, of close grain cast-iron and held in place at the head, the end only being free to expand and contract in its length.

No crossheads or guides being used, the piston is of the trunk type. It is of a close grain cast-iron ground to size. The inside of the top of the piston is provided with ribs for radiation of the heat as well as for strength. To

(*Continued on page* 640.)

Generated on 2024-09-12 08:21 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Battleship Fleet Goes to the Pacific

(*Photograph by Edwin Levick, New York*)

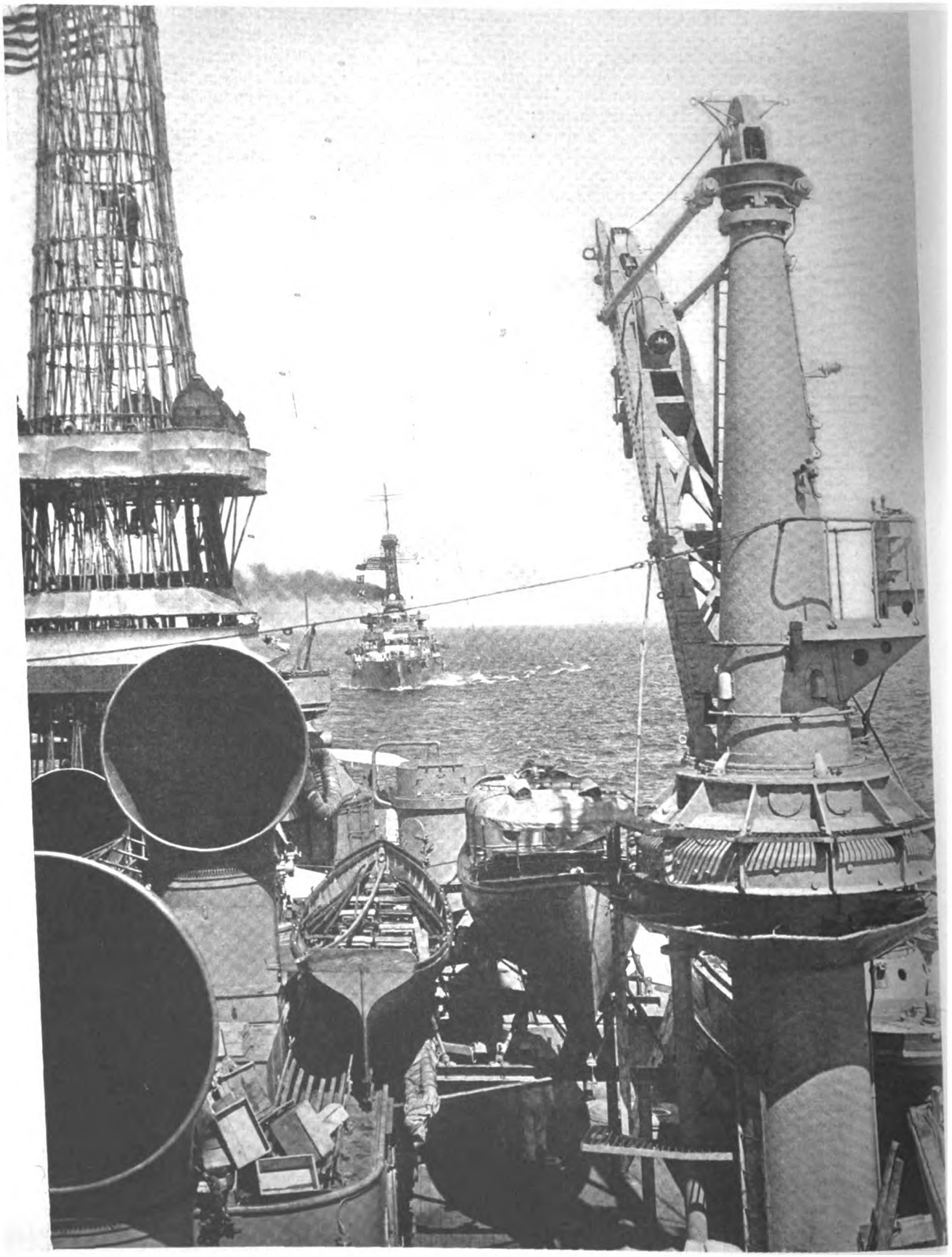
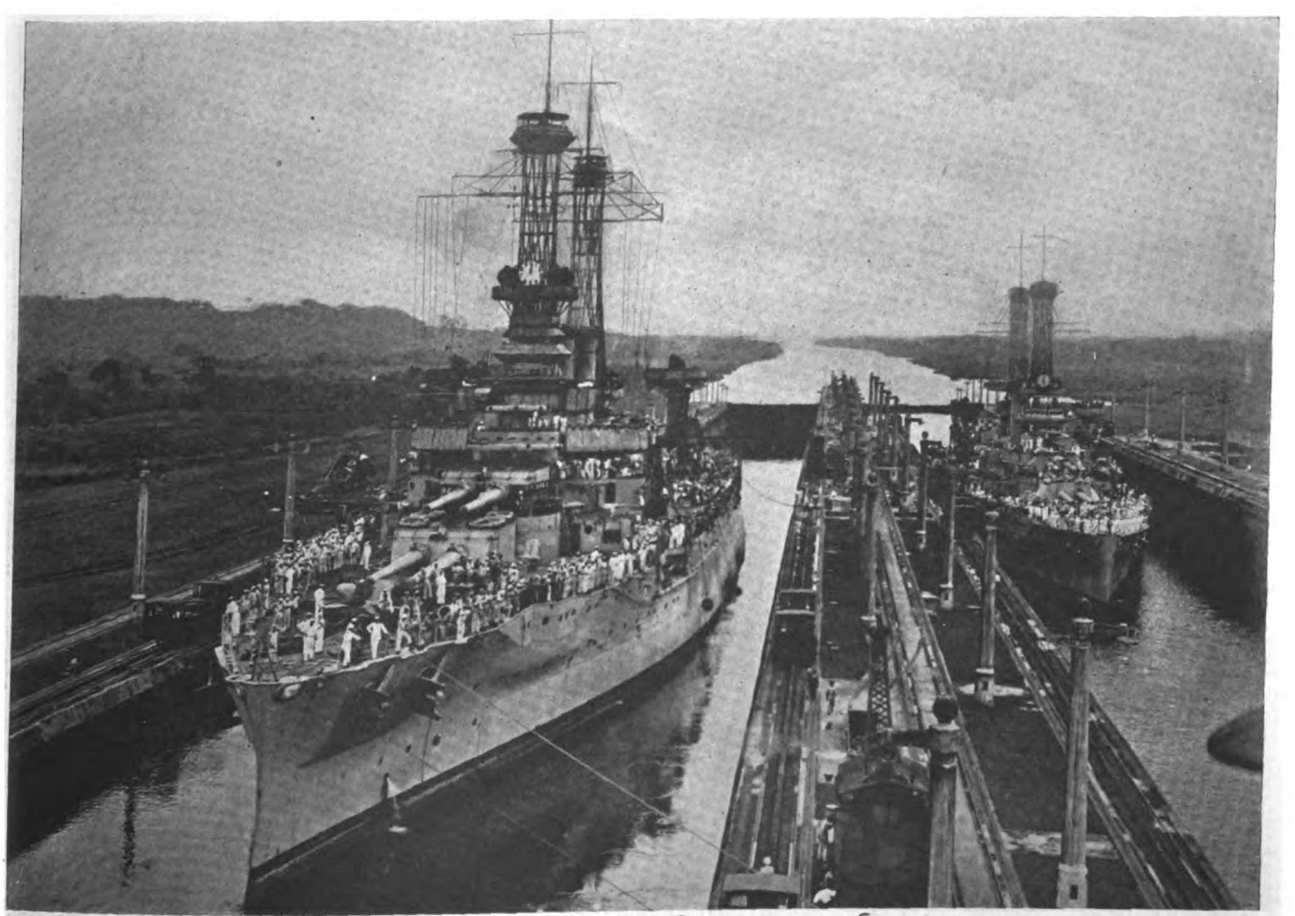


Fig. 1.—Strong Fleet of United States Battleships, with the *New Mexico* as Flagship, Leaves for the Pacific Coast via the Panama Canal

Generated on 2024-09-12 07:53 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

(*Photograph Copyright by* ***Press*** *Illustrating Service, Inc., New York*)

Fig. 2.—The *Wyoming* of Pacific Fleet Passing Through Gaillard Cut



(*Photograph Copyright by Press Illustrating Service, Inc., New York*)

Fig. 3.—Superdreadnoughts of the Pacific Fleet Going Through the Locks at the Panama Canal

Generated on 2024-09-12 08:06 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from
UNIVERSITY OF ILLINOIS AT
URBANA-CHAMPAIGN

Motor Trucks and the Problem of Efficient Marine Freight Terminal Operation—II

BY MERRILL C. HORINE

The use of equipment which can be quickly and easily operated is the determining factor in efficient terminal clearing. Shipments must be kept continuously on the move. In this number Mr. Horine discusses the use of the motor truck for this service, making a scientifically worked out comparison of the horse dray with motor carriers, to the great advantage of the latter, provided reasonable operating conditions are available. Under this head he also discusses the value of store-door delivery, permitting centralized control of carrying agencies and economic routing in collecting and delivering shipments.—THE EDITOR.

VENTURI, the Italian scientist, discovered, in connection with studies of air-flow, that a certain relation between the intake and outlet angles of a choke-tube produced the maximum velocity of air through the restricted throat of the tube with the minimum resistance to the flow of the fluid. His fundamental hypothesis was that for a fluid to pass through a restricted orifice without diminishing the rate of flow beyond that orifice, it must pass through at a greatly accelerated speed. The marine freight terminal problem exactly parallels this example of physical law.

Freight terminals are the place of greatest restriction of area in the path of shipments from place of origin to destination. In order not to slow down all freight movement, the terminals must be capable of passing the freight through at greater speed than the average speed at which it is carried in ships and railroad trains. To accomplish this end, swifter means than handtrucks must be used to move freight across the bulkhead. To avoid congestion of load platforms, quicker loading and unloading of vehicles and faster street conveyances are needed to effect transfers to other terminals, warehouses and local destinations.

QUICK-OPERATING EQUIPMENT DEMANDED

Unloading piers and platforms must not be used for storage, because of their limited area and the necessity of keeping a space clear for the reception of more freight.

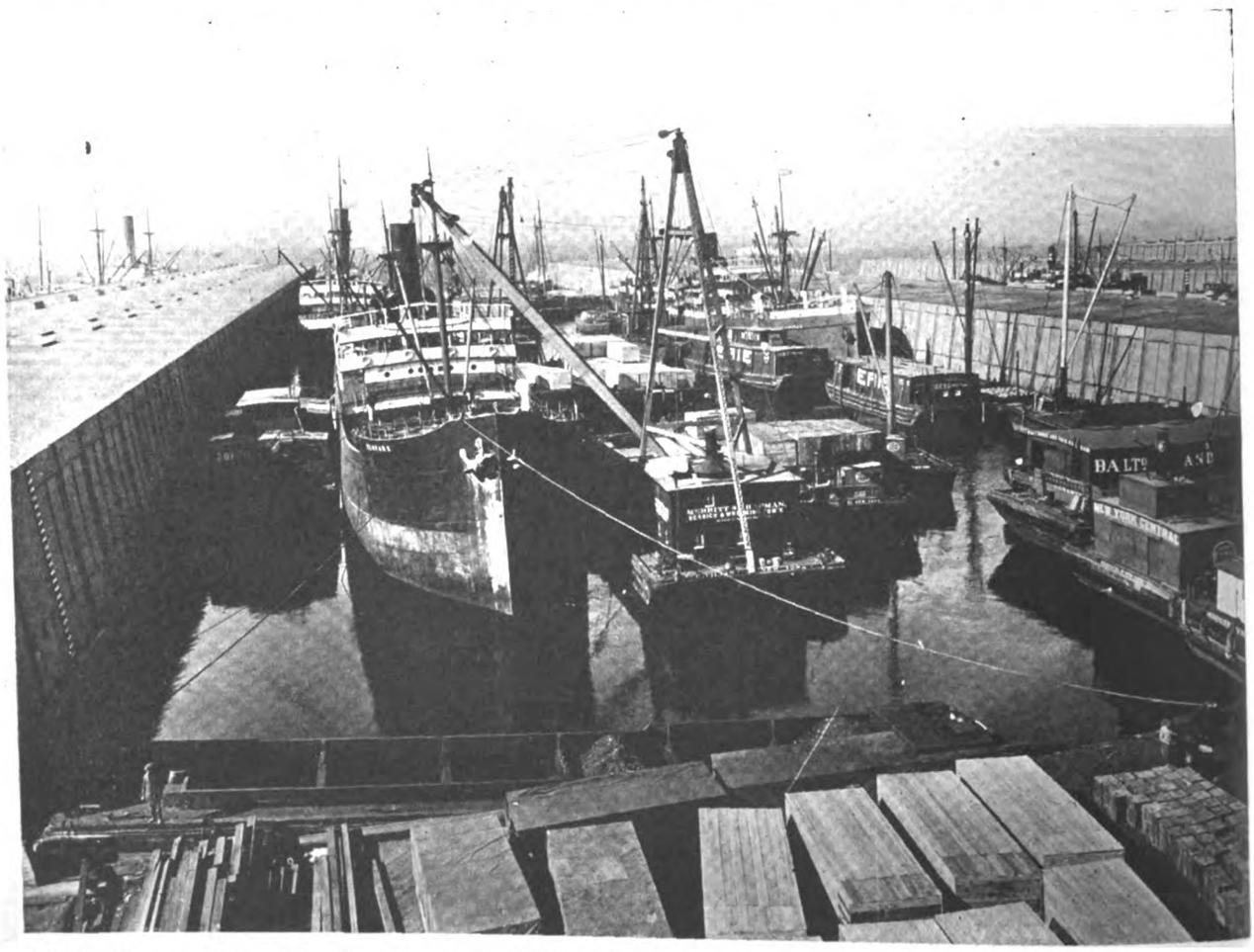


Fig. 8.—Congestion Everywhere—Even the Slips Are Choked With Lighters and Floating Cranes Trying to Load and Unload the Steamers and Make Room for Waiting Ones to Berth. Proper Facilities Would Reduce Even This Congestion—Brooklyn, N. Y.

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

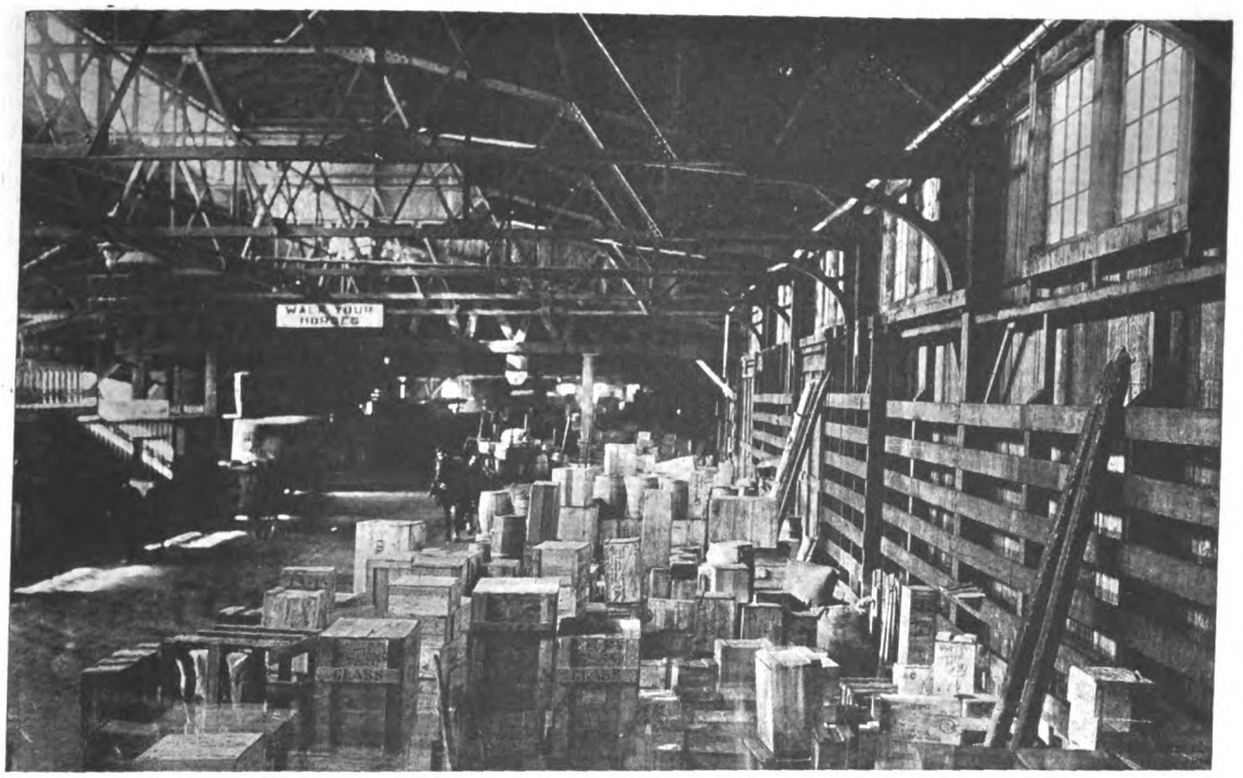


Fig. 9.—Typical New York Pier, Showing Goods Piled on Floor Waiting for Consignees to Call for It, Meanwhile Obstructing the Discharge of New Inbound Cargoes or Assembling of Outbound Ones

This involves immediate removal of goods from piers and platforms to warehouses where there is room for storage, sorting, classifying and efficient loading of vehicles. The movements involved must be made by mechanical means—by electric industrial trucks and tractors, by telpher, escalators and moving platforms. Motor vehicles must be used to supply faster street conveyances, and these must be of high capacity and so efficiently administered that they can maintain a high load factor.

With warehouse loading and unloading accomplished by motor trucks and standardized trucks under one ownership, the most effective devices to promote the vehicle efficiency and to speed up the handling of the goods can be installed—a situation which it is not possible to establish with a miscellaneous assortment of vehicles, averaging less than half a load apiece, calling at irregular hours.

Special Handling Devices for Pier Installation

One device of this character which has proved to be of the greatest effectiveness in several private installations is the sectional demountable body. Such a body when on the truck fulfills the usual mission of a truck body and resembles the conventional rack body in appearance. It is divided into identical sections, however, numbering from two to four, which are interchangeable and demountable from the chassis. Either an electric telpher or a battery tractor may be used to haul them considerable distances within the warehouse, singly or in trains. When detached, they form handtrucks to and from which the goods may be handled manually.

Another device is the lift van, which is quite common in Europe, although it is little used in this country. This comprises a van body, demountable and interchangeable, into which a fragile shipment may be packed at one point and shipped through to destination, even half-way around the earth, without unpacking. It forms the body of a motor truck or horse wagon, may be lifted by cranes, carried on flat cars or in box cars, or stowed in the hold of a ship.

> "If all horse transportation at our docks could be displaced by motor trucks, the number of vehicles required to carry the same daily tonnage would be one-tenth the number used at present. . . . . Why, then, do horses predominate and why are most attempts to operate trucks in terminal haulage failures? The reason is the same as the answer to the question: Why does it cost more to operate ships out of American ports than between European ports? It is because we are attempting to operate twentieth century ships, railroads and vehicles with twentieth-century volume of traffic by terminal methods designed for wooden sailing vessels, narrow-gage railroads and ox-carts."—Merrill C. Horine.

Value of Motor Trucks Under Reasonable Conditions

Today it is unnecessary to demonstrate that motor trucks, given reasonably favorable conditions under which to work, can transport freight more quickly, cheaply and in greater unit volume than horse transportation; yet we find freight terminal work practically the only line of commercial haulage in which horse transportation still predominates. If all horse transportation at our docks could be displaced by motor trucks, the number of vehicles required to carry the same daily tonnage would be one-tenth the number used at present. Everyone knows that, size for

Generated on 2024-09-12 09:04 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

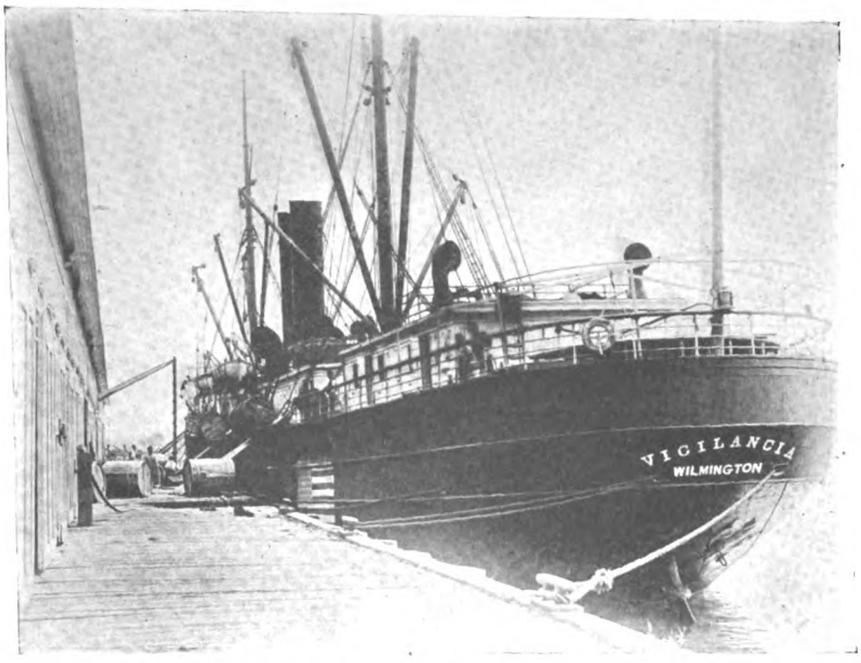


Fig. 10.—Unloading Tobacco from a Coastwise Steamer—Brooklyn, N. Y.

size, motor trucks cost considerably more to operate than horse drays; but, since they are capable of carrying ten times the daily tonnage, the additional cost is still proportionately low when compared with the service they can render. Their operation is not ten times as expensive, and in these times we doubt if two teams can be operated on the amount which represents the daily cost of a motor truck.

Why, then, do horses predominate, and why are most attempts to operate motor trucks in terminal haulage failures? The reason is the same as the answer to the question: Why does it cost more to operate ships out of American ports than between European ports? It is because we are attempting to operate twentieth century ships, railroads and vehicles with twentieth century volume of traffic by terminal methods designed for wooden sailing vessels, narrow-gage railroads and ox-carts.

Horse Haulage vs. Motor Transportation

If it were possible suddenly to replace all of this horse haulage with motor transportation, methods at the terminals would soon shape themselves so that the latter could work efficiently. However, so long as horse transportation predominates, horse-pace methods will prevail and motor truck operation will be quixotic. Horse and motor transportation will no more mix than oil and water.

The average city dray hauls a load of 4 tons, and two trips, each representing about 4½ miles, is considered a good day's work. As the return load is usually a negligible factor, the daily tonnage delivered is about 8 tons.

If intelligently handled, motor trucks, as rented in New York on a 50-mile-per-day basis, will average a full load in each direction. With hauls of 4½ miles average length, this equals 11 loads a day easily, to do which an average speed of but 5 miles per hour is necessary in a 10-hour day. In such a day's work a truck could deliver, with return loads, 110 tons. To reduce the estimate to 80 tons per day is amply conservative and is exactly ten times the work performed by the average team.

If conditions were proper for the operation of motor trucks, it would be feasible to haul goods manufactured 100 miles from a port directly from the factory door to the pier with one loading and unloading, thereby saving many days of time, preventing the destruction of goods due to rehandling, eliminating congestion at railway terminals and switchyards, so that these might serve marine terminals more effectively and, equally important, economizing in the cost of the transfer.

As long as shippers are willing to pay for horse haulage under present conditions, the horse owners are not anxious to push matters. Owners who know their costs are charging $15 (3/6/2) a day for the service of horse

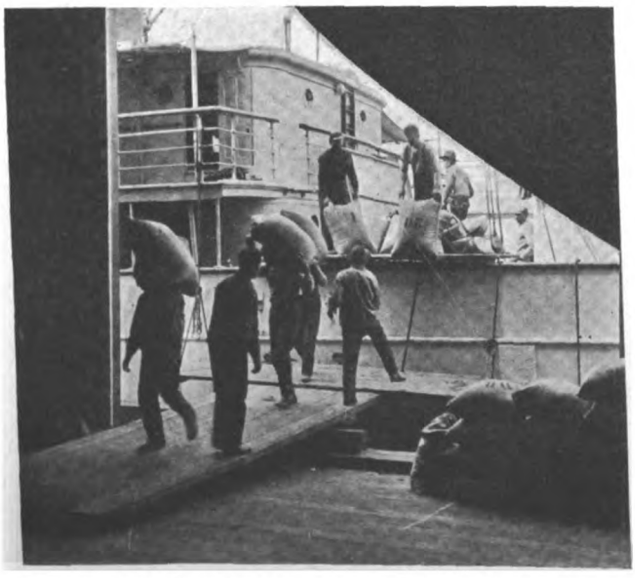


Fig. 11.—It is Methods Such as This That Impede Loading and Unloading Efficiency, Thereby Slowing Up All Transportation, Land and Water—Unloading Coffee in Brooklyn, N. Y.

Fig. 12.—A Passing Figure. Mechanical Appliances Must Replace This Slothful and Expensive Method of Interior Transportation—Coffee Warehouses, Brooklyn, N. Y.

Generated on 2024-09-12 07:53 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Fig. 13.—The Electric Crane Tractor as Used by Bush Terminal Is an Efficient Link Between Pier and Warehouse—Bush Terminal, Brooklyn, N. Y.

drays, or half the price at which one hires a 5-ton truck from a responsible trucking concern. Some horse owners have not made their prices keep step with rising costs and have realized their mistake too late, as witness the recent dramatic failure of one of the largest and longest established transfer concerns in New York.

In some cases a truck can do no more than a horse team, except that when the shipment is large enough it may carry more of a load on the same two trips per day. If conditions were right for the truck, however, an investment of $30 (6/5/0) in truck hire would produce five times the tonnage that $30 (6/5/0) invested in horse transportation does to-day, and would deliver the freight more quickly, which is an important consideration in the handling of perishable stuffs.

Trucks Economize Traffic Space

Such efficiency as is assumed above for the truck is entirely possible if the motor becomes predominant, because of the decrease in the number of vehicles necessary to handle the same tonnage and the economy in traffic room. This latter economy inheres not alone to the decrease in numbers, but results also from the smaller size of the vehicles in overall dimensions, their increased mobility and maneuvering ability and their greater

Fig. 14.—The Electric Industrial Tractor, Because It Is Quicker, Cheaper and More Economical of Space Than the Hand Truck, Must Come Into Use Generally—Pennsylvania Terminal, New York

Generated on 2024-09-12 07:51 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

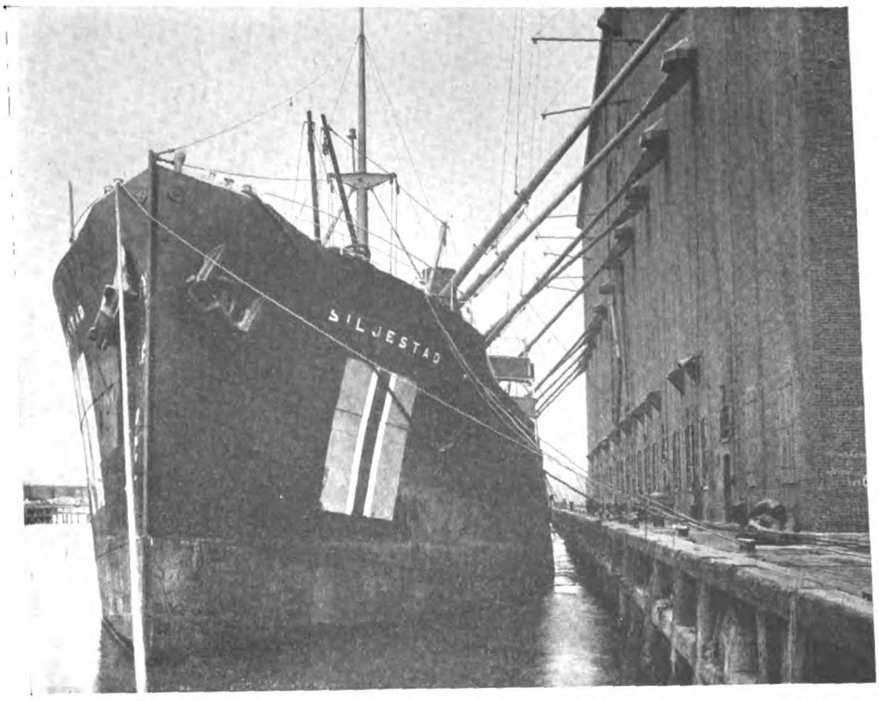


Fig. 15.—There Is No Reason Why Ships in Atlantic Trade Should Require 12 Weeks Per Round Trip. More Than Half This Time Is Spent in Port. During the Wheat Famine in Europe in 1915, This Ship Was Loaded and Cleared the Port in 24 Hours—Weehawken, N. J.

speed, which causes them to ocupy traffic space during a shorter period of time.

An ordinary 5-ton truck is, roughly, 20 by 7 feet and requires 9 feet of side clearance. A horse dray is 25 feet long, including the animals, and should have 10 feet of roadway to allow for the erratic movement of the animals. The truck occupies 180 square feet of traffic area: the horse dray and team, 250. Each truck saves 70 square feet per dray displaced, or 700 for the ten that it can supplant.

These are not newly discovered facts. They have been recognized by economists for years. It is essential that terminal improvement and organization of vehicular transportation go together. Not only would one be checkmated without the other, but it is doubtful if either is possible alone. This has been recognized by the government—which can afford to recognize things, not having competition to reckon with—as is evidenced by its own new terminal on New York bay, at the southerly end of Bush Terminal, where only motor (vehicular) transportation has been provided for.

Shortly before the close of the war it became apparent to the authorities at Washington that terminal sloth was impeding the expeditious movement of both terminal and overseas traffic, which in turn hampered us in making and transporting military supplies for our expeditionary forces. As a result, the Highways Transport Committee, at the instance of the then Director-General of Railroads, William H. McAdoo, evolved a plan calculated to relieve the situation by eliminating the free time at terminals.

The War Emergency—Store-Door Delivery

The method proposed was to institute store-door delivery, beginning with New York and possibly extending it to other ports. The plan at first contemplated a trucking pool, in which all vehicles now serving the terminals would be required to carry capacity loads from the terminals and return loads at all times. Every pier was to be under the control of a government drayage director. Owners of vehicles were to enter into agreement to place them in service for shippers and receivers of freight at large under his direction at uniform rates. These vehicles were to be assigned to the different piers daily and dispatched with full loads of inbound freight each vehicle loaded with goods for a given zone of the city. Having delivered this, each was to pick up a full load and return it to the terminal for shipment.

The freight received each day was to be delivered within 24 hours of its unloading from ships or carfloats direct to the door of the consignee, without action on his part, collection being made by the driver of the vehicle. This feature of the scheme raised an objection, as it was found to be an all but hopeless problem adequately to bond such a miscellaneous lot of drivers. It also had the disadvantage that consignees could not then inspect incoming shipments, and in cases where the goods were to go into storage a second handling was necessary, whereas under the old scheme the consignee would have it trucked directly from the terminal to the warehouse of his choosing.

The scheme later developed into a trucking pool. Only 5-ton trucks were to be used in the service, these being under contract from large concerns or associations of owners, practically establishing a trucking trust, or at least confining the business of a few large operators. As the scheme was discussed, new complications were constantly arising and added objections were raised. Quite naturally the trucking and teaming interests generally were antagonistic, with the result that with the signing of the armistice the scheme was abandoned.

Doubtless the plan was faulty and but few tears were shed over its eventual failure. It is a matter for debate, however, whether the terminal facilities, even with these faults, would not have been more efficient under the new plan than with the present indefensible practice. As one prominent team and motor truck owner expressed it, the scheme provided for close to 100 percent load efficiency as against a maximum of 25 percent now possible.

Store-Door Delivery in Baltimore

Some years ago the Baltimore & Ohio Railroad made store-door delivery in Baltimore. The service was discontinued because the Interstate Commerce Commission ruled that charges for such service could not be absorbed in the freight tariffs as they were in express rates, and it was found impracticable to make a separate charge. Under the latter ruling the company would have had to give the consignee the option of calling for his shipments with his own vehicles, which would have resulted in congestion such as can be avoided only by a monopoly of the pier or terminal by one centrally controlled fleet of trucks.

In England, store-door delivery has existed practically as long as railroading, and the rates are made to include the cost of drayage. The express companies make store-door delivery and store-door pick-ups, for which the charge is absorbed. Free delivery of mail is accepted as indispensable, and, were the public to enter the post office

Generated on 2024-09-12 07:51 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

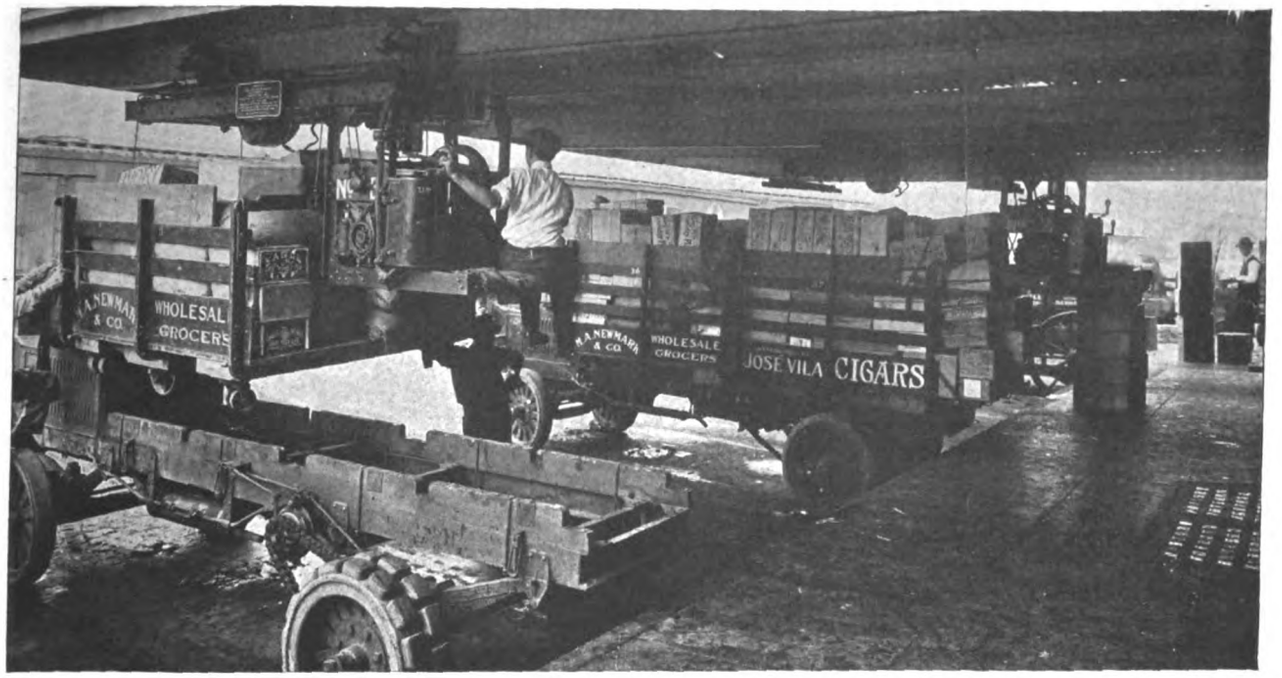


Fig. 16.—Brownhoist Electric Man-Riding Trolley as Used in Wholesale Grocery Store—Los Angeles, Cal.

and ransack incoming mail bags for their letters, the confusion that would result would only be greater in proportion to the greater numbers of searchers than is the present scheme at marine freight terminals.

Free Lighterage a Direct Analogy

Experts have ascribed New York's supremacy as a port to a large extent to free lighterage, so-called, whereby freight can be lightered from any ship or wharf anywhere in the harbor to any railroad pier or designated waterfront warehouse at no charge to the shipper. This is in effect store-door delivery via water and is justification enough for the application of the same principle to land lighterage, as draying may be termed.

The volume of freight lightered about the port of New York is approximately the same as that moved by drays. The explanation of the potent effect of free lighterage on the growth of New York harbor is that it has permitted direct connection of the ship with every railroad entering the city, offering a choice of transportation facilities inland and tapping a breadth of inland territory unparalleled by any other port in the world.

If free lighterage of approximately 20 percent of the tonnage passing through New York terminals can do this, or even lighterage charged for directly, provided the service is universal, then universal, direct drayage should be able to effect an almost similar improvement in the facilities and attractions of the port of New York or any other port in proportion to its size and importance.

(To be continued.)

Hints for Electric Welders

IN notes designed for instruction in electric welding by H. L. Unland, of the General Electric Company, occur certain suggestions which are worth repeating.

When carbon electrodes are used in arc welding the average length for efficient work should be from 9 to 12 inches. Metallic electrodes of low carbon steel should be about 18 inches long. At least 15 feet of extra flexible cable should be used to allow the operator full control of the electrode through the welding process.

Doubt is often expressed as to the current required for certain types of work. In general in the case of light work where the metallic electrode is used a current not greater than 125 amperes is necessary, while heavier work will stand 225 amperes without burning the electrode. Plates of ¼-inch require 125 amperes. Heating with the carbon electrode necessitates the use of greater currents; light welding, 150 to 250 amperes; heavy welding and medium cutting, 400 to 600 amperes; very heavy work, 600 to 1,000 amperes.

Flux is not necessary to good arc welding and has a tendency to contaminate the weld if used. With the metallic electrode the work should be cut sharp—not over ⅛-inch in length. The current should be held within the limits suggested. Excessive current causes burnt or porous metal to be deposited.

In welding a seam the electrode should be moved in a circular path, advancing along the seam. The metal will adhere only to the surface actually played on by the arc, so care must be taken that the entire surface is covered.

The electrode must be connected with negative terminal, as it is difficult to maintain the arc with the polarity reversed. In starting the arc the electrode should be just touched to the arc and immediately withdrawn to the proper distance.

When welding with the carbon electrode an arc 1 to 1½ inches is the average, but in cutting it should only be ½-inch.

The eyes of the welder should be thoroughly protected by a mask from the light of the arc, or serious burns to the interior of the eye will result. No chinks or holes in the mask should be permitted, since only a brief exposure of the eye is required to bring on painful results. The inside of the mask should be kept painted dull black to prevent reflection of the light from behind.

Generated on 2024-09-12 09:04 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Uniform Cost Accounting in Shipbuilding—II

Plan Adopted by the Atlantic Coast Shipbuilders' Association for Uniform Methods of Cost Accounting in Steel Shipbuilding

BY J. L. JACOBS*

For proper checking and cost finding it is essential to have adequate control over all material and supplies through a centralized stores system. Requirements for the purchase of materials should originate in the engineering or production department where the bills of materials are prepared. Purchases should be made through the purchasing department in connection with stores' requirements. Copies of purchase orders should be sent to the stores department so that receipt of materials can be checked with purchase requirements, and no stores should be issued from stock except upon written requisition.

Material and Supplies—Stores' Control

With proper centralized stores' control, the accounting of costs of material and supplies presents no particular difficulties, as each transaction is directly traceable to a specific job account or departmental use. A clear distinction is drawn between (1) general stores and (2) contract stores. Under general stores are included all stock materials and supplies which are not assigned to any definite or specific job. Under the general stores are such subsidiary stores as general supplies stores, fuel stores, paint stores, etc.

The material classification includes the main material and supply divisions which will be used by the engineering or production department, by the purchasing, stores and traffic department in connection with the preparation of bills of material, purchasing, receiving, storing, issuing, pricing, inventorying and assembling of material costs, and will serve as the basis for analyzing materials which are in work in process.

The main divisions of the materials and supplies classification are as follows:

1. Material.
2. Parts.
3. Structural Units Complete.
4. Supplies.

Each of these main divisions is defined, and detailed lists of articles are set up in the classification under each of the divisions.

The keeping of the material cost records will be of value in connection with the following:

(a) Basis for estimating and for preparing bills of material.
(b) Basis for comparing quantities of particular items going into specific product units with standards.
(c) Making sure that all materials entering into a product have been accurately charged.
(d) Computing and analyzing material charges.
(e) Ascertaining the degree of completion on any job.
(f) Checking waste or excess amounts of any particular material entering into a product unit.

Labor Classifications and Operations

The classification of positions and occupations under main groups according to the character of work and under distinctive occupational titles should be used as a basis for the preparation of payrolls and of statistics on wage charges, selection, labor turnover, accidents and other employment conditions.

The following labor classification is drawn up on the basis of general character of work. Under each class there are included the different positions and occupations which are found in the average shipyard.

The main classes of the classification are as follows:

1. Executive, Administrative and Supervisory Class.
2. Professional Class.
3. Clerical Class.
4. Supervising Producing Class.
5. Skilled Trades Class.
6. General Labor and Miscellaneous Class.

The occupations enumerated under the Skilled Trades Class correspond to those included in the decision of October 1, 1918, by the Shipbuilding Labor Adjustment Board (Macy Board). This list is subject to any subsequent rulings which have been made by the Macy Board.

Descriptions of the duties of the occupations listed are included in the "Handbook on Shipyard Occupations," published by the United States Shipping Board Emergency Fleet Corporation.

The basic units for labor costs in shipbuilding are the labor processes or operations. The distribution of labor costs according to the major labor operations will be used for purposes of cost control, estimating, comparing costs with standards and gaging the efficiency of classes of workers in the productive departments, on the various jobs and for the plant as a whole.

Some of the more important labor operations are included in the following:

1. Annealing, Hardening and Tempering.
2. Assembling.
3. Bending and Flanging.
4. Bolting.
5. Chipping and Calking.
6. Coremaking (Foundry).
7. Drilling.
8. Erecting.
9. Fabricating.
10. Fitting.
11. Laying Out and Templating.
12. Melting (Foundry).
13. Molding (Foundry).
14. Painting.
15. Planing.
16. Punching and Shearing.
17. Reaming and Countersinking.
18. Riveting—Machine.
19. Riveting—Hand.
20. Scarfing.
21. Varnishing and Polishing.
22. Welding.

Timekeeping and Cost Distribution

The value of accurate methods of reporting and recording the daily time of each employee for payroll-making and for proper distribution of labor hours and costs against production cannot be stressed too greatly. For accurate payroll-making, for proper control of labor in

* J. L. Jacobs & Company, industrial engineers and cost accountants, Chicago, Ill.

Generated on 2024-09-12 08:03 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

production and for estimating and comparative purposes, it is necessary to have proper timekeeping methods, the essentials of which are as follows:

(a) Proper method of recording the daily time of each employee. There should be time clocks on which each worker should register in and out time, or there should be some other method of obtaining the same results.

(b) Job or operation tickets should be turned in by each worker for the various operations performed each day. On these job tickets there should be recorded the worker's number, the production order number, the product unit number, and the time taken on each operation.

Where mechanical sorting and tabulating equipment is available, the tabulating card and the job ticket can be one and the same, the requisite information being noted on the card in writing and the punching of the cards being done later in the timekeeping office.

(c) The total time and cost, as found from the daily in and out cards, as explained in paragraph (a), should check with the total time and cost of all the operations on job tickets. This check should be obtained daily by departments.

(d) The job tickets should be sorted by trades to obtain the actual hours, the number of hours converted into eight-hour days, the total pay received and the pay per eight-hour day. The total pay in this case should check with the totals under paragraph (a) and paragraph (b).

(e) Job tickets should be sorted in order to obtain hours and pay on piece work, on day work, on overtime, on direct labor and indirect labor, and on all of these by departments. The total pay in each case should check with totals obtained above.

(f) Job tickets should be sorted by labor operations and by job accounts or product unit numbers for posting to the cost summary sheets.

Expense Classification and Distribution

Costs of direct labor and direct material entering into production are applied directly to the job account or product unit. Costs of indirect labor and indirect material and other operating and fixed charge expense, which cannot be applied directly to the specific job account or product, are included under "expense."

To obtain accurate and uniform distribution of expense to the job accounts, the expense items are grouped under specific classes and expense accounts as given in the classification of expense.

Expenses are applied to the job accounts or product units after they have been distributed to the specific departments.

To accomplish the purposes set out above, all expense charges which fall under specific departmental groups have been included under departmental expense divisions. Those expense charges which are not departmental in their nature are included under non-departmental expense divisions.

The principal divisions and definitions in the expense classification consist of the following:

1. Productive Departmental Expense.
2. General Works Expense.
   (a) Departmental.
   (b) Non-Departmental.
3. General Works Distributive Expense.
4. Auxiliary and Stock Manufacture Expense.
5. General Administrative Expense.
   (a) Departmental.
   (b) Non-Departmental.
6. Fixed Charge Expense.

Under each of these divisions are included specific expense accounts to which all expense charges should be made directly:

1. *Productive Departmental Expense* includes the indirect charges of the respective productive departments.
2. *General Works Expense* includes the indirect expenses chargeable to production costs which cannot be charged directly to some definite productive department and which cannot be applied to one of the other classes of expenses in the classifications which follow:
3. *General Works Distributive Expense* includes all expenses directly attributable to the operation of the general works distributive departments.
4. *Auxiliary and Stock Manufacturing Expense* includes all expenses incurred in the operation of an auxiliary and stock manufacture department.
5. *General Administrative Expense* includes all expenses in connection with the conduct of the general administration or office activities of a shipbuilding company.
6. *Fixed Charge Expense* includes all expenses such as rent, taxes, interest paid or accrued, insurance and depreciation, which are more or less fixed in character, being incurred whether the plant is in operation or not.

Definitions and the manner in which each of the items of expense should be treated are set out clearly; so that the uniform basis of distributing expense and applying such expense to the cost of the product units or jobs will be established. This clear and uniform policy of method of treating certain expense costs will eliminate the present divergent practices with reference to expense distribution and application.

The proposed uniform methods include the principles, definitions and treatment of all such expense items, including such items as:

(a) Express, Freight and Drayage.
(b) Spoiled or Defective Work.
(c) General Administration Expense.
(d) Advertising.
(e) Sales Expense.
(f) Rent of Floor Space.
(g) Interest.
(h) Discounts.
(i) Insurance.
(j) Taxes.
(k) Depreciation.

In order to obtain uniform basis of expense distribution to the productive departments and the application of the expense to the job accounts, it is provided that:

(a) The total cost of such of the general works distributive departments, such as the cost for power, light and heat service, etc., should be apportioned to the various departments on the basis of the actual service or benefit received by each department. Where it is possible, the distribution should be made according to meter readings or floor space used. Where meters are not installed, estimates of the horsepower used by various machines, wattage of lamps for light service, the floor space occupied for heating, etc., should be used.

(b) The general works expense should be distributed

Generated on 2024-09-12 07:51 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

to the productive departments (and to such auxiliary and stock manufacturing departments as may exist) on the basis of the total labor cost in the particular period in each operating department. After such general works expense has been distributed to the respective departments, it should be applied to the product units or job accounts on the basis used for the application of productive departmental expense, namely, direct labor hours.

(c) The basis suggested for use in the distribution and application of general works expense should be used for the distribution and application of the general administrative expense. This applies to both the case of distribution of central general administrative expense to the individual plants, and to the distribution of the general administrative expense of any one plant to the productive departments and to the product units or job accounts of the individual plants.

(d) The productive departmental expense (as well as auxiliary and stock manufacturing expense to their respective products) should be applied to the product units or job accounts on the basis of direct labor hours.

Cost Figures for Standards and Estimates

In addition to production and operating control, the cost figures will reach their greatest value when they are made a basis for standards and estimates. The use of operating cost figures for these purposes is premised on accurate collection, classification and distribution of the charges for material, labor and expense. The application of uniform cost methods should result in the accumulation of valuable data, to be used as the basis for the establishment of definite standards and as an aid in estimating costs of new work.

The operating statistics will show fluctuations in wages of labor and in prices of material. When unit costs fall below or above the estimates on account of changes in operation or economic conditions, the explanations given in the operating statistics will be the basis for the revision of estimates.

Standards for all elements of costs should be developed not only in terms of dollars and cents, but in terms of labor hours, machine hours, material quantities, units of count and expense per labor hour. Comparisons in terms of dollars and cents are of value in cost control. The use of units of count will be of especial value in gaging labor efficiency and material consumption and in estimating, regardless of fluctuations in rates of wages, purchase prices of materials, etc.

The comparative summary report on the major labor operations should show, in addition to the total production considered and the percent of work completed, the cost per unit and the labor hours for each operation. The labor operation standards will thus not only serve as measures of operating efficiency, but will also aid in connection with estimating.

Standards developed in connection with quantities and costs of materials should be of great value in drawing bills of materials and estimates and should provide indices for checking of the quantity and cost of materials used in each job. Such standards will also be used in some instances as measures of the state of completion of jobs.

The establishment of department expense standards is of value for control of operating costs. With uniform and definite methods of expense distribution, it is possible not only to obtain comparable standards of departmental expense within individual yards, but these standards become available for the comparisons of major expense items between shipyards.

Summary Cost Reports and Statistical Statements

The summary cost and statistical reports are the culmination of adequate cost accounting methods, and when figures become available for such reports the proper functioning of the uniform cost methods in all the shipyards is assured.

To obtain maximum benefits from the uniform cost methods and the cost figures and standards, it is important that the summary cost and statistical statements be designed and arranged with a view of furnishing to the executive such information which is necessary in order to have knowledge of costs, production and operation conditions.

If the summary cost reports are to be of greatest value to the executives, the reports should be small in number and only the more important activities should be included. The figures should be arranged in a simple manner and should be available for use at the earliest time possible after the close of the cost period.

The following are the important summary cost and statistical statements which have been laid out according to the plan of uniform cost methods recommended herein:

1. Comparative General Balance Sheet.
2. Comparative Profit and Loss Statement.
3. Comparative Statement of Production Operations.
4. Comparative Statement of Cost of Completed Jobs.
5. Statement of Work in Process.
6. Comparative Statement of Material Inventories.
7. Comparative Statement of Major Labor Operations.
8. Comparative Statement of Expense Costs.
9. Force Statement by Departments.

These controlling cost reports and statistics will be of use for the individual shipyards. Where comparisons are made between shipyards, the items to be compared will be arranged in a similar manner, the essential difference being that such reports will include comparisons of the major items in the different shipyards, whereas the individual shipbuilding reports are confined to all costs and production and operating conditions in the respective yards.

The Pittsburgh Marine Oil Engine

(*Continued from page* 629.)

seal the piston and cylinder six patented snap-rings are used. At the bottom of the piston another ring is placed, preventing oil splashing from the crank-case reaching the cylinder.

The connecting-rod is of soft, open-hearth steel, machined all over. The crank-end is of the marine type, bronze boxes lined with genuine babbitt metal. For adjustment, shims similar to those on the main bearings are used.

To avoid the possibility of cracks, the cylinder head is of a special grade of cast-iron symmetrical in design and thoroughly water-cooled. Its inlet and exhaust valves have heads of cast-iron—also of a special mixture—welded to open-hearth steel stems. The cams, rollers and pins are of open-hearth steel, hardened and ground. The camshaft is located in front of the cylinder frame above the openings for the crank-case. The bearings for the shaft have removable, split, bronze shells. As to the valves, these are operated by rockers and rods. All rod-boxes and rollers are bronze-bushed, and the entire system of cams, lower roller rockers and bearings works in a bath of oil.

Generated on 2024-09-12 08:05 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

A Cost System for Shipyards—III

How the System Is Operated—Practical Application in the Case of a Hull Under Construction or Under Contract

BY CREIGHTON CHURCHILL*

The system is purely a matter of collecting data for cost purposes along the lines laid down. In its main features it consists of a definition of costs, a structural classification for segregating costs to different parts of a ship, and a system of standing orders to enable cost data to be recorded according to a regular routine. Aside from approaching the subject from an organization point of view, the only unusual feature suggested is the standing order classification, which, as far as the writer knows, is not in use in any shipyard. The basic idea underlying the entire study of shipyard costs has been not only to outline a simple system but to work it out in such a way that the data accumulated can be used for making analyses by which executives may be kept informed as to unit costs as a measure of efficiency. This information, to be of maximum value, must be timely; that is to say, must be placed before the executive at certain specified times and in a comparative form such that progress for better or worse will be shown. Such cost reports in connection with daily reports of performance should tell the whole story and enable an executive to give his personal attention where it is most needed.

The System

In the actual operation of the system comprehensive and up-to-date records can be secured at a minimum of expense by the use of tabulating machines. A card used in connection with such machines has been developed along the lines proposed and is shown in Fig. 2.

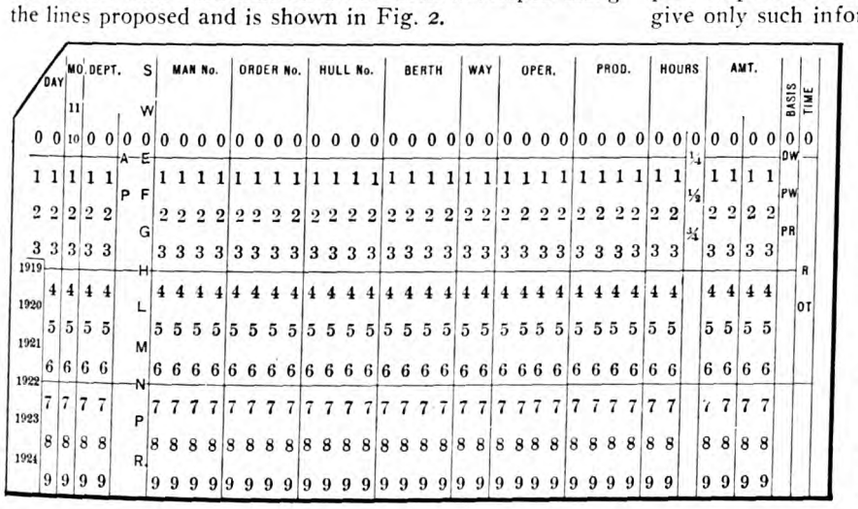


Fig. 2

The headings of the columns explain themselves, with the exception of "Berth," which is a matter of special development along the lines of structural classification which involves the method of marking steel, heretofore mentioned as a subject for another paper.

The columns headed "Operation" and "Production" record the operation and units of production so that unit costs, during certain definite periods of time, such as a week or a month or quarterly, may be ascertained. Obviously such records, for use with tabulating machines, must have a key to work from, as the information is furnished from time cards or work tickets and holes are punched in the cards to represent such operations and units of production as may be necessary. For example, the operation of riveting on the ways may be assigned the number 1 as the key number, with 100 rivets as the unit of production. If a riveter showed 600 rivets as a day's work, the card would be punched with 1 in the "Operation" column and 6 in the "Production" column. If it is desired to get the total rivet drive on the ways for a week, the cards would be mechanically sorted for that week under 1 in the "Operation" column, then put through the tabulating machine, which would turn out the week's total under the "Production" column. The same cards would give the total amount of money paid out to the riveters, consequently the unit cost is a simple matter of division. In the same way the average drive per man per week or day can be obtained and referred to a standard, indicating the performance efficiency. Keeping in mind the system of workmen's numbers, the costs by crafts on a given hull can be secured by proper mechanical sorting and tabulating or the total amount of direct labor charged to a hull up to date is obtainable. It is evident, therefore, that within the limits of the design of the card any sorting and tabulating is possible. It is customary to adopt a definite plan of procedure to be followed for everyday use and to give only such information as may be desired. Inasmuch as the cards are permanent records, they are at all times available for any special data required for unusual analyses.

If one considers a shipyard with 3,000 or more daily time cards or work tickets and the time and money required to sort and tabulate by hand the information on these, it is evident that the doing of such work mechanically would not only be more economical but would immensely reduce the chance for errors. With the machines the only chance for error is in punching the card. The writer holds no brief for tabulating machines and suggests their use from actual experience. To cite an instance, he recommended their use in a munitions plant and did the work with six clerks that the comptroller had estimated would require over twenty to do it by hand. Where a large number of men are employed the use of these machines is most certainly justified, provided the impossible is not expected and the card is designed in accordance with requirements.

Assuming the use of the tabulating machine card for accumlating labor charges and production records, it is but another step to use a properly designed card of another color for material charges, thus securing permanent records, covering practically all the information necessary to a complete record of operation, in such shape that it

* Member of the firm of Churchill & MacLeod, New York.

Generated on 2024-09-12 08:03 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

may be used to the greatest possible advantage. The design of such a card is merely a matter of providing that the material charges are made to proper accounts in accordance with the general scheme.

To illustrate the practical application of the proposed system the eight requirements will be used as captions, under each of which examples will be given in more or less detail showing its workings, using for the purpose a hull, No. 17, which may or may not be one of several of a similar type, being constructed under a certain contract.

1. *Provide for all charges for direct labor and direct material*

All charges under this requirement are covered by "Standing Orders—Output" on page 547. For example, all direct labor on hull No. 17, Main Steel Structure, would be charged to 17-10, as would also all direct material. The specific operation of riveting would be charged to 17-10-1, assuming that the figure 1 represents the operation of riveting. If the figure 2 represented the operation of cutting out defective rivets, the charge number would be 17-10-2. It is evident that the classification of operations by numbers, as above outlined, can be carried to any degree of refinement required or desired. Irrespective of the extent to which it is carried, it does not involve the men on the job, for it is used only by the cost accounting department through the description of the work, which is or should be recorded on all time cards or work tickets.

Should the direct labor cost be desired by production centers, the organization symbol in connection with "Standing Orders—Output" furnishes the proper charge number. For example, 1PH-10 would cover all direct labor on the ways, or 17-1PH-10 the direct labor on the ways on hull No. 17. In the same way, 3PH-10 is the charge number for direct labor in the plate and angle shop, and 17-3PH-10 the direct labor in that shop for hull No. 17.

The direct material charges are made direct from stores issues, hence have no bearing on the information required to be recorded on time cards or work tickets covering direct labor. For this reason the same number in the standing order classification can be used for both labor and material.

2. *Provide for all charges for indirect labor and indirect material, located at its source as far as possible*

This requirement is covered by "Standing Orders—Maintenance and Repair." For example, labor of an indirect character in the upkeep of the yard would be charged to 3PP-100. The same labor in the machine shop would be charged to 1PM-102. Repairs to a locomotive crane is covered by 2PP-102 for both labor and material. General office janitor service would be charged to AG-101 unless all janitor service is charged to "Maintenance and Repair," in which case the charge number would be 3PP-101. In the same way, defective castings would be charged to 3PM-105 and spoiled work in the plate and angle shop to 3PH-105. Consumable supplies, such as waste, machine or cutting oils or compounds, would be charged to the shop symbol followed by the number 104.

Material charges involving repairs to equipment will bear the same charge number as the labor involved and may or may not be covered by a separate material charge, depending on whether the material is classed as consumable stores or whether it actually has to be drawn from stores on a material requisition. There will be no double charge in either case, provided proper instructions are issued and a routine established covering repair material.

3. *Provide for overhead charges other than those in* (2)

"Standing Orders—General Expense," page 547, will cover all requirements under this caption. They refer in all cases to what may be called general matters, as will be seen by reference to the classification, and they have no direct bearing on productive functions. As a general rule, all charges of this nature will be made by general accounting and not by cost accounting. In its actual application to a going yard, it should be made as extensive as may be necessary to account for all general expense without any possibility of confusion. For example, 1005 is the charge number for depreciation which may or may not be allocated at its sources, such as 3PM-1005 for foundry depreciation, depending on whether or not general or cost accounting is responsible for such allocation. Again, the charges under 1001 and 1008 should be matters for very definite instructions, more especially the latter, as they might be considered a capital investment under certain conditions and should be so charged in the general books. Attention is also called to charges under this standing order classification that should go into profit and loss rather than overhead expense.

4. *Provide for charges to structural classification*

This requirement is covered by "Standing Orders—Output," page 547, and is illustrated under (1).

5. *Provide for charges to crafts where necessary or desirable*

This is covered by "Standing Orders—Output" in connection with workman's numbers or operating classification. For example, as explained in (1), riveting on hull No. 17 is charged to 17-10-1. Riveting on other hulls is similarly charged, hence the total riveting charge is obtainable. On the other hand, this can be secured by totaling the cards of all workmen whose numbers are 1PH-1000 to 1PH-1999, and 3PH-1000 to 3PH-1999.

6. *Provide data for unit cost of all classes of output*

This requirement is met by the data recorded on the time cards or work tickets; that is to say, the production and the amount of money involved. As indicated elsewhere, proper units of all classes of work should be established. Tabulating machines are particularly useful in meeting this requirement.

7. *Provide data for estimating in accordance with structural classification*

This is simply a proper application of information gathered under (4).

8. *Provide data for cost analyses*

It is evident that this is a matter of using the information secured for certain definite purposes. For example, how much overtime was worked in a certain period or what was the comparison between the cost of certain work under overtime and regular time.

Consideration of the foregoing will show that the standing order classifications furnish a complete system of control accounts which may be utilized for tying in cost accounting with the general accounts.

While the hull structure has been generally used in illustrating the application of the proposed system, a little consideration will show that it is equally applicable to engine and boiler manufacture. In fact, properly applied, it will also serve the purposes of a repair yard, which ordinarily offers a much more difficult problem from a cost accounting point of view than a purely construction yard.

In conclusion, it is pointed out that the proposed cost system confines most of its details to the cost accounting department, where they belong, and offers to the working forces a very simple method of allocating charges at their source through the standing order classifications. In practice the organization will acquire familiarity with the system in a remarkably short space of time. With cer-

Generated on 2024-09-12 08:01 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

tralized production and material control in effect, it is confidently believed that ship construction costs would become a simple system of adequate and timely records, pointing the way to economies heretofore not deemed possible and enabling the industry to enter the competitive field without fear or favor.

Oxy-Acetylene Welding and Cutting at the Newport News Yard*

BY H. I. WALSH†

THE Newport News Shipbuilding & Dry Dock Company has a welding department that stands alone—that is, it is not attached to nor does it form a part of any other shop or department. All welding in the yard comes under the direct supervision of the welding foreman, and he is held responsible for all welding or cutting done on new or repair work.

In this department is a complete acetylene generating and compressing plant, consisting of three 300-pound generators, gas holders, dryers, purifiers, compressors and one hundred and fifty 225-foot and ten 100-foot acetylene cylinders. The acetylene cylinders are distributed throughout the yard, on the shipways, in the shops, on the dry docks and on ships undergoing repairs throughout the harbor.

At the angle and beam shops there is a 300-pound generator, and both the main and auxiliary shops are piped for acetylene and are now being piped for oxygen.

The oxy-hydrogen plant consists of one hundred and one cells, producing 400 feet of oxygen and about 800 feet of hydrogen per hour, two 5,000-foot gas holders, oxygen and hydrogen compressors, five hundred 200-foot cylinders, two tanks for oxygen, of 1,000 feet capacity each at 350 pounds pressure, and two for hydrogen. At present the hydrogen is mostly waste, but it is the intention to use it for cutting at the scrap yard, in the foundry and forge shop, and in other places where it can be used to advantage and where safety and efficiency are paramount considerations.

All the gas plants are working twenty-four hours per day, six days per week, and three hundred 220-foot cylinders of oxygen are being purchased from the open market per week.

The welding shop is equipped with all modern appliances for handling welding jobs, such as brick furnaces, portable and electric hoists, cast slabs and welding tables. Oxygen, acetylene, hydrogen, city gas and low- and high-pressure air are all piped into this shop. Hydrogen is used also for preheating castings instead of city gas or charcoal. At present about forty acetylene welders and one hundred and twenty-five cutters are employed in this shop.

At the angle and beam sheds fifteen acetylene welders are employed regularly welding frames, staples, rings, and, in fact, anything that is to be welded which enters into the construction of a modern ship. The anglesmith of today has little else to do but bend to shape the material he is working, as the welders do most of the cutting and all of the welding. Six men are kept constantly busy doing both new and repair work in the smith shop. The fittings and parts that are forged and which have to be welded are done either by the electric or acetylene process, and all parts that have been heretofore worked in the fire after being welded are now being done by acetylene.

In the boiler shop and sheet iron department welders are kept busy on such work as angles, tanks, uptakes, hatches, smoke stacks, ventilators, etc. New and old castings of brass, iron, steel and aluminum; copper, brass, steel, iron and cast iron pipes and plates of all sizes and shapes are being successfully welded—in fact, anything that can be welded, from delicate parts of coin-counting machines to castings weighing from ten to twelve tons, is being welded.

All cutting at the foundry and forge shops is now being done with either the acetylene or hydrogen torch. Anything up to 24 inches in diameter can be cut by this process. In boiler and ship repair work a saving of approximately 100 percent in time and cost over the old methods is being shown. This includes such work as cutting out plates, rivets, tubes and staybolts, also the welding of patches and cracks in boilers and tanks, broken and worn parts of all kinds of machinery from the wireless fittings to main engine cylinders and bed plates.

The acetylene torch has supplanted the old charcoal basket and oil burners for heating bent frames, bilge keels, stems, stern posts, shell plates and propeller blades. Quite a number of patches have been successfully welded on bronze, cast iron and steel blades.

Since the armistice was signed, hundreds of gun platforms have been removed from supply transports by the cutting torch in a very few hours and without delaying the ship. This could not be done by any other method, time and cost being considered.

The cutting up of boilers and other scrap that naturally accumulates around large shipbuilding and repair yards and the salvaging of parts that can be used again is done quicker, cheaper and neater with the torch than by any other known method.

* From a paper read before the annual convention of the International Acetylene Association, New York, July 15, 1919.

† Newport News Shipbuilding & Dry Dock Company, Newport News, Va.

Auxiliary Machinery on British Standard Ships

CONSIDERABLE interest is now being taken in the machinery of the standard ships built for the British Government, in view of the fact that they are ultimately to be transferred to private owners, and the question has often been asked whether in design and efficiency the best available marine practice is being adopted, especially with regard to coal consumption. It is well known that there has been no standardized design of machinery in the standard ships, each selected builder having put forward what in his opinion was the best under the exigencies of the war conditions which existed when the vessels were planned and built, and as a result many proportions in each of the different sizes of engine for the various types of standard vessel vary considerably, this being noticeable even in some of the essential details.

Under the circumstances existing in the marine engineering industry during the war, practically no progress in reciprocating engine design has been possible; but as engine builders have recently been given more latitude by the Admiralty authorities, improvements which perforce had to be hung up will now be gradually incorporated in the design and other improvements introduced. In an arrangement recently adopted by Messrs. Richardsons, Westgarth & Company, Ltd., at Hartlepool, the auxiliary condenser is embodied in the main engine structure, thereby not only effecting considerable saving in labor and material, but enabling more work to be done economically in the workshops and less work done expensively when installing the machinery on board ship. The saving in piping alone is equivalent to about 40 feet of an average diameter of 4 inches, and, further, the arrangement enables many more of the pipes and fittings to be standardized, thus permitting them to be manufactured at less cost.

Generated on 2024-09-12 08:02 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

INTERNATIONAL
Marine Engineering
Published Monthly by
ALDRICH PUBLISHING COMPANY, INC.
6 East 39th Street, - - - - - New York
H. L. ALDRICH, President and Treasurer
GEORGE SLATE, Vice-President E. L. SUMNER, Secretary
and at
8 Bouverie St., - - - - London, E. C.
E. J. P. BENN, Director and Publisher

H. H. BROWN, Editor

Contributing Editors
Rear-Admiral C. W. Dyson, U. S. N. William Gatewood
Commander S. M. Robinson, U. S. N. H. McL. Harding
Professor C. H. Peabody William T. Donnelly
Captain C. A. McAllister, U. S. C. G. (Retired)

Card Indexing Magazine Articles

FOR the convenience of those readers who for reference purposes are keeping a card index file of the important articles in the engineering press, the table of contents of MARINE ENGINEERING has been revised so that the items which it contains can be clipped and pasted on reference cards without the necessity of recording the title of the article and reference data. In the new arrangement the table of contents is printed in two columns. In the case of important articles, not only are the title of the article and page number given, but directly underneath are printed a brief summary of the contents of the article and the name of the magazine and month and year in which it appeared. By clipping these items the reader is spared the necessity of filling out the index cards, and this device, it is hoped, will encourage more of our readers to acquire the useful habit of keeping a complete card index of the valuable information published in the engineering press.

Merchant Shipbuilding

SINCE the signing of the armistice, contracts for something like 145 vessels, aggregating about 750,000 tons, have been placed in American shipyards—an amount of tonnage which two years ago would have represented a record year's volume of business. The fact that orders for nearly half of this tonnage were placed within the last month shows that in spite of the dawdling of Congress in shaping up a definite policy regarding the future of the American merchant marine the shipping industry is gaining confidence and intends to take advantage of the unprecedented turn of affairs which has again restored the American flag upon the high seas.

To what proportions the phenomenal growth of the shipbuilding industry in the United States has reached is illustrated by the latest returns from Lloyd's, which show that out of the 2,526 merchant vessels of 100 gross tons or over, aggregating 8,017,767 gross tons, now under construction in the world's shipyards, 994 vessels of 3,874,143 gross tons are building in the United States, as against 782 vessels of 2,524,050 gross tons in the United Kingdom. Last year American yards turned out 3,033,000 gross tons, as against 1,348,000 tons in Great Britain. During the period January-August, 1919, American yards turned out 2,203,000 gross tons and the British yards only 630,000 gross tons. That there are no signs of any let-up in the momentum gained by American shipbuilders is shown by the fact that during the three weeks ending August 2, 9 and 16, the output from American yards totaled 69 vessels of over 1,000 gross tons each, aggregating 306,071 gross tons!

With the present phenomenal output and the recent influx of orders for new tonnage, in addition to the 8,000,000 tons still to be completed for the Shipping Board and the 1,124,473 tons under construction for the Navy Department, there surely is no reason for anyone to be pessimistic as to the immediate future of shipbuilding in the United States.

Lubricating Systems for Geared Turbines

PROBABLY the most important detail in the laying out of a geared turbine installation is the provision of a simple and reliable oiling system. So vital is the question of lubrication to the operation of the machinery that too much attention cannot be given to the design and layout of the oiling gear fitted. The pressure system of lubrication is always adopted in modern turbine installations, and in addition to providing for the lubrication of the main bearings of the turbines themselves, provision must also be made for the efficient lubrication of the gears, this comprising the lubrication of the various bearings supporting the pinion shafts and the gear-wheel shafts, in addition to the lubrication of the teeth at their point of contact. In fact, it may be said that the problem of efficient turbine lubrication consists of the provision and the maintenance of a film of oil at every point where two metallic surfaces move the one over the other.

Two systems of lubrication have been devised, the first in which separate oil pumps are provided, usually in duplicate, and the second in which the pumps are direct driven from one of the shafts of the gearing. In the case of double-reduction gearing the intermediate gear shaft is employed for this purpose. In both systems the lubricant is delivered to a gravity tank situated as high as possible above the machinery, 20 feet being considered a minimum figure in this connection. The oil to the bearings and the gears is supplied from this tank by gravity, some form of float valve being provided to govern the delivery automatically from the pumps.

With the pressure oiling system, as found on board torpedo-boat destroyers, it is still necessary to employ some form of strainer to filter the oil before delivery to the machinery. There is, however, a danger that these may, on becoming choked up, interrupt the service.

Opinion among turbine designers is divided as to the relative merits of the oil pumps direct from the gear shaft, as compared with the independent pump. It is

Generated on 2024-09-12 08:00 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

recognized that under circumstances when the vessel is maneuvering for a long time, the direct-driven pumps may not be capable of supplying a sufficient quantity of oil; it is therefore usual to instal a small dependent oil pump. Moreover, with the direct-driven pump it is certain that a larger quantity of oil is circulated than is actually necessary. The independent pumps, while lacking the extreme reliability of the direct-driven pumps, are, when properly controlled, able to deliver only just that quantity of oil needed by the system, and this, no doubt, will have much to do with increasing the life of the lubricant, as well as tending to simplify the filtering arrangements.

The Propulsion of Single-Screw Ships

THE determination of the horsepower necessary to drive any particular ship at a given speed may be made by the choice of a suitable Admiralty constant or by model experiments. In the former all the factors which comprise the performance of the ship are included, and no special calculations are required to ascertain the resistance of the ship or the efficiency of the screw. Certain advantages therefore are to be gained from using the constant methods, but these are nullified to some extent by the uncertainty as to the constant to choose. Care must be taken to fix one which from previous actual experience has been obtained in a vessel very close to the type being powered. When the model experiment method is adopted the problem is only partly solved, as the effective horsepower thus obtained forms, roughly, only one-half of the total power to be installed. The choice of the proper propulsive efficiency thus becomes an important item, and this can only be done with satisfaction when the effective and indicated or shaft horsepowers of a previous vessel of similar type are known.

In the analysis of the performances of ships it has been a matter of some surprise to find that in spite of the high hull efficiency single-screw propulsion does not appear to be much superior to that with twin, triple or quadruple screws. When Sir William White many years ago gave a paper to the Institution of Naval Architects on "The Speed Trials of Recent Ships of War," this feature was referred to. Many times since then has the fact that single-screw ships do not surpass twin-screw vessels in gross propulsive efficiency been alluded to. In the case of the *Vespasian*, for example, the results of which were given by Sir Charles Parsons to the Institution of Naval Architects in 1910, the propulsive efficiency was only 53 percent with reciprocating machinery, a performance which has often been excelled by twin-screw vessels.

It has been suggested many times that the efficiency of a good propeller should be in the region of 70 percent. If this figure were accepted, the difficulty of accounting for the moderate propulsive efficiencies of single-screw ships becomes the more acute. Now it is probable that the majority of screws in common use may have such an efficiency when revolving at some particular slip, but it is certain that, when revolving, such screws are exerting the necessary thrust to drive the vessels to which they are attached at their particular speed, the real slip at which this thrust is given is greatly beyond the point of maximum efficiency. This point has been admirably illustrated by the latest experiments of McEntee in the Washington tank.

A certain propeller was attached to four separate models and propelled in the Washington basin. It was found, by independent experiment, that this particular screw had a maximum efficiency of 71 percent at about 13 percent real slip. The efficiency curve then fell rapidly, until at 53 percent real slip the efficiency was only 50 percent. The models were of a full cargo ship and the slips at which the screw was working when the necessary thrust was given varied from 40 to 50 percent in the four models tried. The actual efficiency of the propeller within these limits was 60 percent. On a basis of shaft horsepower the hull efficiency value was 1.05, the wake being greater than the thrust deduction loss. If it be assumed that the mechanical efficiency of reciprocating machinery is 90 percent, this 63 percent on the shaft horsepower basis would be reduced to about 56 percent on a basis of indicated horsepower—a not unreasonable figure.

It must be remembered that, although in single-screw vessels the propeller is placed most advantageously from the wake standpoint, a large thrust deduction factor is generally associated with these high wakes.

In the measurement of wake values in a model basin it is possible that some errors arise, not necessarily in the determination of these factors, but in their direct application to full-sized ships. In model experiments the frictional resistance is a greater proportion of the total than is the frictional resistance of a full-sized ship; that is, a correction must be applied to the model resistance in order to arrive at the proper ship resistance. If, then, the frictional resistance is magnified in model results, is it not more than likely that the frictional wake is also greater than would obtain in the actual vessel? What the difference would be is problematical, but it undoubtedly would have the effect of reducing the hull efficiency as measured by tank methods and go in the direction of accounting for the obtained propulsive efficiencies in single-screw ships.

The main point, however, is in the loss in efficiency due to the great slip at which the majority of single screws operate. When limited diameters obtain, the thrust necessary to propel a full slow form can only be produced when the screw is revolving with great slip, and this means on the descending point of the efficiency curve.

It will be interesting to learn from the results of the trials of the numerous cargo ships being fitted with geared turbines if the hopes of obtaining relatively high propulsive efficiencies with these are obtained. Unfortunately, the war retarded the adoption of this type of machinery in cargo ships, and insufficient data are at hand regarding the sea performances of geared turbine vessels. Should the hopes be realized, a great step will have been made towards the attainment of higher efficiencies and great economies.

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Letters from Marine Engineers

Discussion of the Design and Handling of Marine Engines, Boilers and Auxiliaries—Breakdowns at Sea and Repairs

This department is open to all readers of the magazine for the discussion of affairs in the engine room. All letters published are paid for at regular rates. Your ideas or experiences will be mutually helpful and interesting to other engineers. Write your letter now.

Bearing Clamps

A rather good idea came to my notice recently when I visited the engine room of a ship that was docked for repairs. The first assistant was doing some refitting work to the bearings of the main engine circulating pump. He had four pieces of pipe with tits on them bolted down

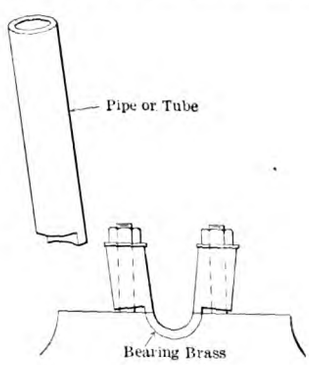


Fig. 1

under the regular bearing bolts, as indicated in the accompanying sketch. The tits of the pieces of pipe pressed down on the upper edges of the lower half of the bearing shell, as indicated; this clamped that half of the bearing down as firmly as if it were held by the upper bearing cap and its liners. With these clamps in place he did the work of spotting and scraping.

The idea is one that is worthy of attention for those who have small size bearings with shells or bearing brasses

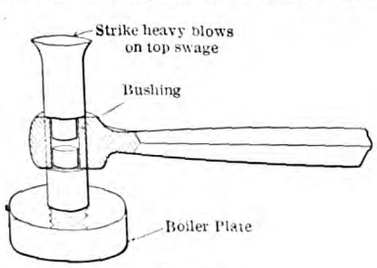


Fig. 2

that are thin and liable to spring out of true when the bearing bolts are released. The same scheme can be applied to the brasses of the caps or of the connecting rods. Bolts of suitable size must, of course, be used.

It surely has proved worth while to the writer to make these visits to brother engineers when such opportunities come. The above idea, for example, will eliminate much of my future bearing troubles, because it will now be possible for me to fit the bearing brasses clamped to their seats just as they will operate.

I also learned from him that the worn bushings of the links, rods, and rocker arms of pumps, etc., can be made to give longer service by swaging the bushings closed a small amount, and then reaming them out to fit the pin. The scheme is shown in Fig. 2. Two swages or drifts are used. The lower one is set into a base made of boiler plate; the upper one is held in place by hand. The diameter of the outside of the swages is equal to the inside of the hole into which the bushing fits, while the tip or pilot is just a few thousandths smaller than the pin on which the bushing turns. By striking heavy square blows on the top drift the small bushing is closed in sufficiently to permit light re-reaming to secure a good fit. Since on board ship there are many small bushings, such a scheme is worth using.

Concord, N. H. C. H. Willey.

Piston Ring Spreader

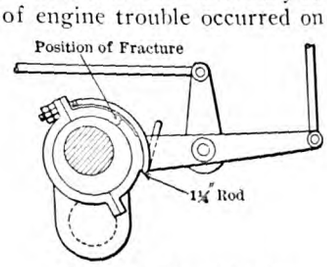
The piston ring spreader shown herewith was designed by an automobile mechanic, and I noted the ease with which by its use he spread the piston rings for starting them on over the pistons or taking them off. The spreader

Piston Ring Spreader

is made out of 1/16-inch sheet steel. Any reader with a knack for making things can easily form a pair of these ring pliers from the sketch. When it becomes necessary to overhaul the engines of the ship's motor boats, the work of cleaning out the rings can be greatly facilitated with the use of this tool. Assistant.

Broken Eccentric Strap

An instance where it became necessary to slow down the ship because of engine trouble occurred on the steamship



Repairs to Eccentric Strap

Jacona, carrying a deckload of timber from Quebec to Leith, Scotland.

It developed that an eccentric strap on the Bremmes

Generated on 2024-09-12 08:06 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

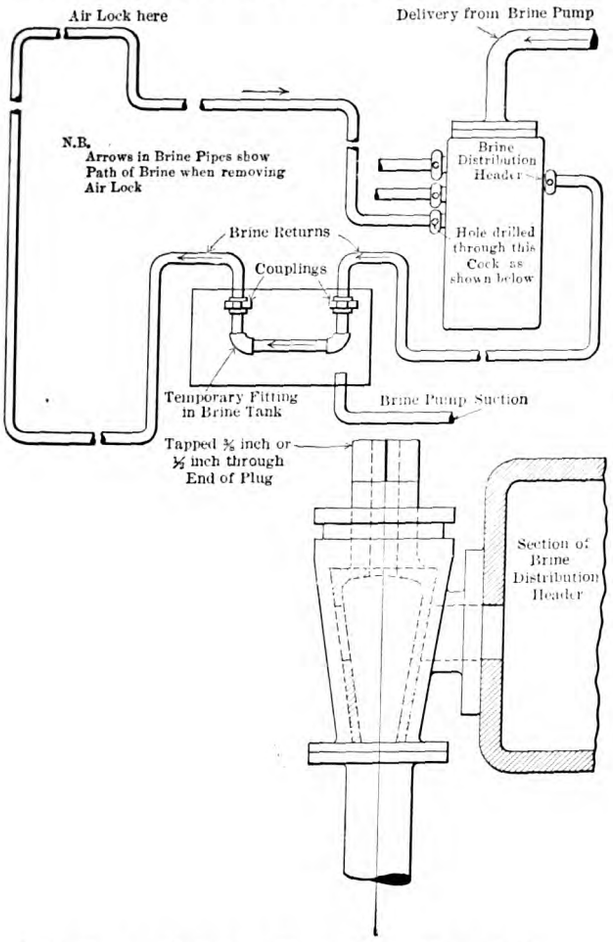
valve gear, with which the triple-expansion engine was equipped, had fractured at the point indicated in the sketch. The chief engineer devised a rapid and adequate repair for the trouble. It consisted in simply bending a 1¼-inch rod to the position indicated and bolting it there.

This repair proved a good one, for some time later the patch, which had been fitted as a permanent repair while in port, gave way and it was necessary to use the rod again.

Port Chalmers, N. Z. W. I. ESPLIN.

Removing an Air Lock from Refrigerating Machinery

With the safety of about half the cargo of mutton carried in a vessel of 13,000 deadweight tons depending on the immediate repair of the refrigerating machinery, a


Air Lock here
Delivery from Brine Pump
N.B.
Arrows in Brine Pipes show Path of Brine when removing Air Lock
Brine Distribution Header
Hole drilled through this Cock as shown below
Brine Returns
Couplings
Temporary Fitting in Brine Tank
Brine Pump Suction
Tapped ⅜ inch or ½ inch through End of Plug
Section of Brine Distribution Header

Sketch Showing Method of Clearing Brine Pipes of Air

rapid method was devised for cleaning the brine pipes of an air lock causing the trouble.

The refrigerating plant in question consisted of duplicate sets of carbon dioxide machines and brine circulating systems for cooling the holds. Soon after leaving port, two of the systems ceased to operate and it became necessary to remedy the trouble immediately.

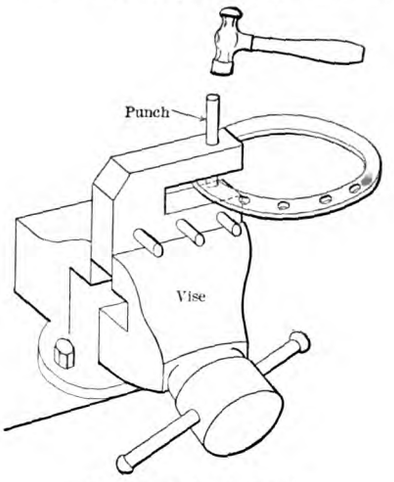
A hole was drilled and tapped in the cock at the brine distribution header, as indicated in the sketch. When the pumps were started a mixture of air and brine was ejected from this hole. As soon as a steady flow of brine indicated that the air has been entirely exhausted from the system, a plug was fitted into the hole in the cock. No further trouble with the air lock was experienced.

Port Chalmers, N. Z. W. I. ESPLIN.

Bench Vise Punch

Where anyone has need for such a tool it will be hard to beat this type of home-made punch for small size holes. The sketches herewith show both the details and a view of the punch in use.

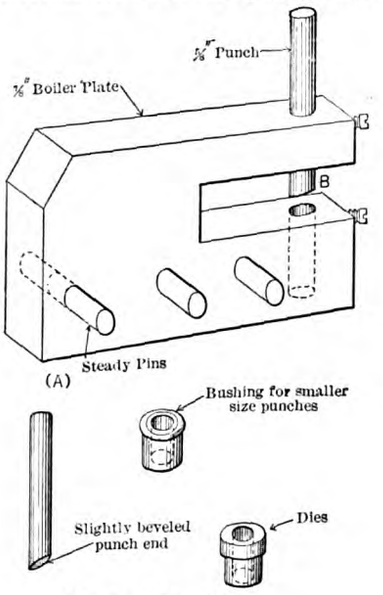
A piece of seven-eighths-inch boiler plate is used to make the frame. Steady pins are put into the frame as



Improvised Bench Punch

indicated at *A*; these rest on the vise jaws and prevent movement of the frame. A slot *B* is cut deep enough to suit the thickness of work to be handled. Bushing and dies can be made, if desired, so that other sizes of punches can be used.

I have found it more convenient to make separate punches and frame for each size punch, since these are



Details of Vise Punch

very easy to turn out. For punching thin sheet metal and all gasket work these punches stand up very well, and since they can be made from scrap stock in spare time they are very cheap.

ENGINEER.

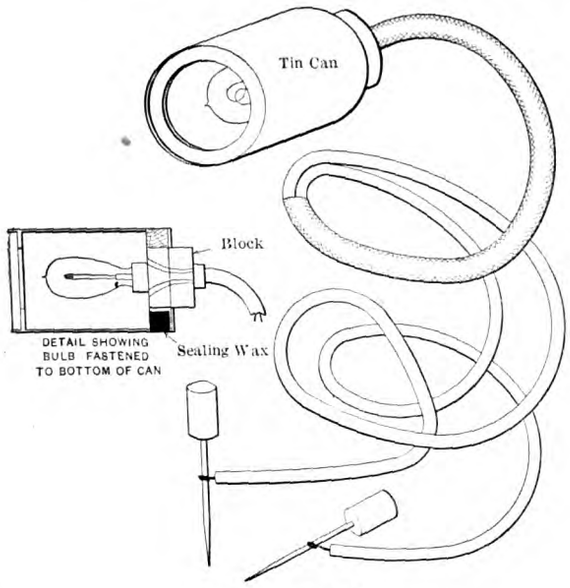
The Lukens Steel Company, Coatesville, Pa., is operating a new 204-inch plate mill, which is the largest in the world. The rolls are of the 4-high reversing type, each weighing 30 tons.

Generated on 2024-09-12 07:59 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Unbreakable Test Lamp

In going about the ship testing for grounds and trouble the ship's electrician who carries an unprotected test lamp breaks many bulbs, and, as the breakage of bulbs runs quickly into a neat sum of money, it behooves the chief to watch the lamp costs.

The use of a small size tin can for protecting the test lamp, as shown in the sketch, will prevent the waste of



Guard for Test Lamp

bulbs by the careless electrician. A base socket is secured to the bottom of the can by means of screw bolts bolted through to a block on the outside. After the wires are connected, sealing wax is poured in around the base socket.

ELECTRICIAN.

Fan Engine Piston Repaired at Sea

While on a voyage from Antwerp to Newport News recently, the fan engine of the steamship *St. Leonards* came to a sudden stop with a crash. Upon investigation, it was found that the piston rod nut had slackened sufficiently to strike the cylinder head, breaking both the head and piston and bending the piston rod.

Running without the fan, under natural draft the ship could only make 7 knots, where it should be doing 11½

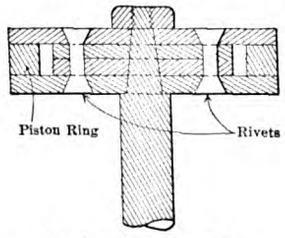


Fig. 1.—Built-up Piston

with forced draft, so that something had to be done to repair the fan engine at once. It was a comparatively simple matter to straighten the rod and make a new cylinder cover of stokehold plates, and the piston itself fashioned from the same material did not present any great trouble. The piston rings, however, were quite another matter, for all the work of fitting the old ones from the steam piston to the new piston had to be done with hammer, chisel and file. They were finally put in shape, however, and the whole riveted together. Fig. 1. This built-up piston gave good service until replaced when the ship reached port.

Port Chalmers, N. Z. W. I. ESPLIN.

Improved Valve Seat Reamer

When you tackle that job of regrinding in the engine valves of the ship's motor boat, if you have on hand in the scrap bin an old discarded valve, try the stunt shown in Fig. 1.

A reamer can be made by cutting teeth around the circumference of the valve seat. Cut the teeth as accurately as possible with a file, then caseharden the valve head and you will have an improvised valve seat reamer that will quickly remove the scale or carbon from the seats. If the valve is of good steel it will harden well enough to ream

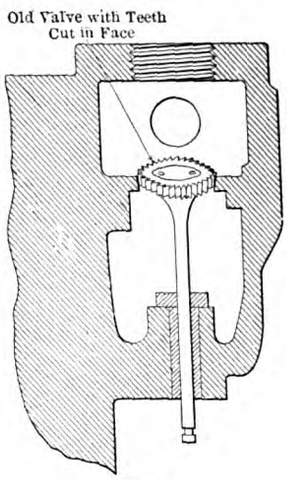


Fig. 1

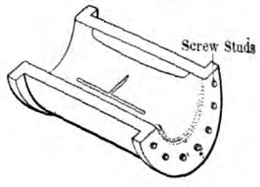


Fig. 2

Fig. 3

off a light chip or pitted seats. The stem is left on to act as a guide. The reamer is turned by a regular valve grinding tool which engages the holes in the valve top.

BUILT ON END BEARING

One of the sets of end brasses of a small gas engine which drove motor boat propellers in a test tank had become worn at the ends, due to shaft thrust. The thrust block had not been properly adjusted. When the engine was returned to duty in the shop it was found necessary to overhaul it. The work of building on the worn ends of the brasses was accomplished as shown in the sketches Figs. 2 and 3. Several small holes were drilled and tapped in the flange of the brass and small brass screws put in and cut off about an eighth of an inch long. Then, as shown in Fig. 3, the end was treated with acid and heated and banked with solder run on generously with the copper. The bearing was then filed and scraped to a neat fit. This eliminated the end play and was far cheaper than the cost of obtaining and fitting a special set of new brasses.

C. H. W.

Several of the ore steamers belonging to the Grangesborg Oxelosund Company, Sweden, are equipped with ice chests of especially good insulating qualities. A record of the installation on the steamship *Narvix* during a trip from New York to Gothenborg, Sweden, shows that of the original 3,000 pounds of ice put in the chest June 20, about 100 pounds remained on July 14. Food had been kept in perfect condition all this time. The box was placed on the poop deck and subjected to the direct rays of the sun throughout the voyage. The dimensions of the chest are 12 feet by 7 feet 3 inches by 7 feet and it is insulated with 4-inch encysted balsa wood covered with ⅞-inch spruce strips inside and out.

Generated on 2024-09-12 08:16 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Questions and Answers for Marine Engineers

Inquiries of General Interest Regarding Marine Engineering and Shipbuilding Will Be Answered in this Department

This department is maintained for the service of practical marine engineers, draftsmen and shipbuilders. All inquiries should bear the name and address of the writer. Anonymous communications will not be considered. The identity of the writer, however, will not be disclosed unless the editor is given permission to do so.

Steering Gear Layout

Q. (1015).—What is the best way of connecting the steering wheel with the steering engine?

A. (1015).—Your question is somewhat indefinite, since the best method of running the control gear from the steering stand to steering engine will depend in part upon the position of the latter and the type of ship.

In many American sound and coastwise steamers the steering engine is placed directly under the pilot house. This allows a vertical control shaft which (except perhaps for an expansion joint to allow for any straining of the deck) will be devoid of bevel gears and knuckle joints. By this method the wheel can be easily handled and the gear is dependable. The engine is commonly connected to the quadrant by a chain and steel rods.

Placing the steering engine in the engine room has the great advantage of giving the engineers in charge no excuse for neglecting it, and may also save the increased attention and upkeep of steam and exhaust pipe lines. The attachment from the steering engine drum is usually by chain and rods to the quadrant, which must be overhauled at intervals. The writer has known of a case in which several of the links, 1⅛ inches in diameter, were worn two-thirds of the way through in eight months.

A quite common practice in modern vessels is to connect the steering engine directly with the rudder quadrant by worm and spur gearing, or to the rudder yoke, as with the screw type steering gear. In the cheaper installations the rudder stock is rigidly held; there are no springs to relieve rudder strain—in fact, the installation of a quadrant worm gear in many of the wooden steamers may account for the failure of the rudder stocks of these ships. However, with a steel rudder stock of good proportions, and the doing away with the wire rope or chain connections from engine to gear, the danger of the steam steering gear being thrown out of commission is in a great measure relieved. Where the steering engine is not directly below the steering wheel, shafting with bevel gears and knuckle joints, or wire rope working on drums near the steering wheel and engine are used.

It is usual to design the gear so that from 6 to 8 turns of the wheel will throw the helm from hard over to hard over. It is quite surprising how easily a properly installed control shaft made up of several lengths of shaft and bevel gears will turn. Special attention should be paid to the keys in gears and knuckle joints, since they have a tendency to work out. The alinement of shafting is also important, and where the vessel is liable to work, as in a wooden ship, or where the distance from the pilot house to the engine is great, the use of wire rope control is fairly satisfactory. One layout calls for the use of blocks at all bends; where the lead is straight the wire may be run through piping or brass fairleaders spaced every six feet. The diameter of the sheaves should be about twenty times the diameter of the ropes or over. A means of taking up the slack in wire is essential.

The telemotor installation has some good features, since the piping may have numerous bends and may be of great length without increasing the friction of gear. Care must be taken with this type of steering apparatus so that no air shall be permitted to get into the system, since it is thereby rendered useless.

Engine and Propeller for Motor Boat

Q. (1018).—I intend to install a 30-horsepower engine in a motor boat, hull 35 feet long by 7 feet 9 inches beam at waterline, and 20 inches molded draft (skeg will extend below). What speed may I expect and what size propeller should I install? The engine develops 30 horsepower at 800 revolutions per minute. The boat is of runabout model, transom stern, and of ordinary construction.

A. (1018).—If your lines are free and easy, a coefficient of $c = 9$ in formula

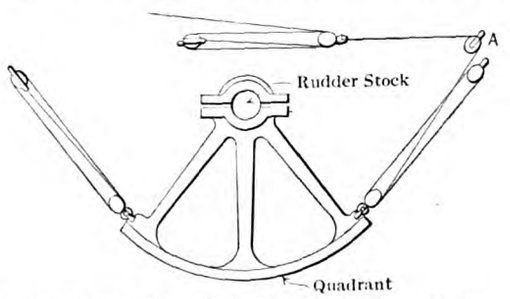
$$v = c\sqrt[3]{\frac{L \times \text{brake horsepower}}{\text{Beam}}} \quad \text{(Keith's formula)}$$

will give about 12 miles per hour. A propeller of 22 inches diameter and 82 inches pitch should prove satisfactory. L = length of waterline.

Relieving Tackle

Q. (1019).—What is a relieving tackle (as applied to a steering gear) and when is it necessary to have the same installed? A. C. J.

A. (1019).—The United States Steamboat inspection rules call for a relieving tackle on all steamers unless an auxiliary steam or hand gear is provided which is entirely independent of the regular gear. Where the steering engine is amidships, a relieving tackle may be rigged to prevent excessive strain coming on the steering rods or chains due to a rough sea.



Sketch Showing How Relieving Gear is Rigged Up

The sketch shows one way of rigging up the gear; it is really nothing more than two tackles rigged so that as the tiller slats over to one side, one tackle pays out and the other is hauled in. If desired, a means of taking up the slack may be provided by reeving the end of the starboard tackle through a guide block A and attaching the same to a watch tackle. This tackle may be rigged to handle the rudder entirely independent of the steam gear.

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Shipbuilding and General Marine News

Contracts for New Ships—Shipyard Improvements—Engineering Projects—Improved Appliances—Personal Items

SHIPPING BOARD ABOUT TO DISPOSE OF 137 STEEL AND WOOD VESSELS

About $89,000,000 Involved in Three Deals—Ships to Carry Coal to France and Italy

Early in the month the Shipping Board announced that the sale of 100 vessels of the Frederickstadt type at the rate of approximately $210 per deadweight ton was about to be consummated. These vessels vary from 3,300 deadweight (2,200 gross) to 3,600 deadweight (2,400 gross) tons. The negotiations are being handled by J. Herbert Anderson, 165 Broadway, New York City, representing the Anderson Overseas Corporation. About $80,000,000 is involved in the transaction. These vessels, which have a coal-carrying capacity of from 350,000 to 450,000 tons, will be used for that purpose by France and Italy in the present emergency.

On the Pacific Coast the Government, it is reported, is about to sell four 3,720-ton steel steamers to the Pacific Mail Steamship Company, 508 California street, San Francisco, at an average cost of $200 per ton. The vessels are oil burners, capable of making 10 knots.

On August 27, the Shipping Board announced the sale of three steel steamers to the Coastwise Transportation Company, Boston; two to J. E. Dockendorff & Company, New York; one to the Fidelity Steamship Company, Boston, and one to W. R. Grace & Company, New York.

In addition the Shipping Board announced on August 3 that a cable had been received from its London agent announcing that a purchaser stands committed to take over twenty wooden steamships of the Ferris type; that the prospective buyer has deposited funds in the bank awaiting the acceptance of his chase of 100 additional ships has been granted to the same party. The cable asked authority to sign the contract, and this permission was cabled.

Wood Ship Sales

All the wooden vessels to be sold in this particular group are of 3,500 deadweight (2,333 gross) tons. The purchaser pays $300,000 for each vessel. This sale brings the total number of wood ships disposed of up to fifty-eight. The Board now has 174 wooden vessels in various services.

H. E. Frick, district manager of the United States Shipping Board, reports the sale of six uncompleted hulls to the Universal Shipping & Trading Company, Seattle, Wash. These vessels have been stored in Lake Union pending sale. As may be noted in the illustration approximately thirty of these vessels are tied up at this place. Negotiations for twelve more hulls are being carried out, and it is probable that other sales will be reported in the near future.

JAPANESE INTERESTS FORM STEAMSHIP COMBINE

Kokusai Kisen Kaisha Formed With $50,000,000 Capital

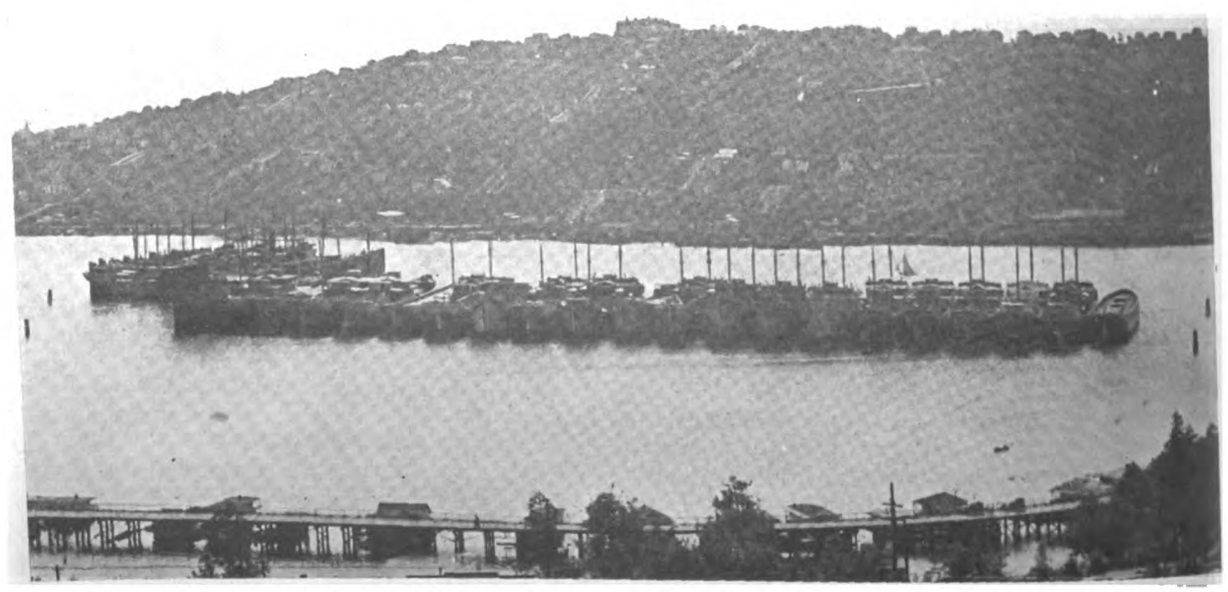
The Kokusai Kisen Kaisha (International Steamship Company) has been organized in Yokahama with a capital of $50,000,000 to carry on extensive steamship service between New York, South America and the Orient.

The line is to have 499,500 tons of ships under its operation. According to a statement, issued by K. Doi, no American capital is involved. The following distribution of shares has been announced:

	Tonnage	Number of Shares
Kawasaki Dockyard Co...	275,000	1,100,000
Suzuki Company.....	84,300	337,600
Asano Shipyards.....	51,500	206,400
Hashimoto Kisen Kaisha.	25,400	101,600
Yamashita Kisen Kaisha.	23,600	94,000
Uchida Kisen Kaisha....	17,300	71,200
Nippon Kisen Kaisha....	17,300	69,200
Ishikawajima Shipyard...	5,000	20,000

Fore River Plant to Build Battleship No. 54

On August 1, Josephus Daniels, Secretary of the Navy, announced that battleship No. 54, to be named the *Massachusetts*, will be constructed by the Fore River plant of the Bethlehem Shipbuilding Corporation. This ship, which is the last of the authorized battleships to be contracted for, will have a displacement of 43,200 tons.



Thirty Wooden Vessels Moored in Lake Union Awaiting Sale. These Hulls Represent the Expenditure of About $12,000,000

Generated on 2024-09-12 08:03 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

CONTRACTS FOR 49 LARGE VESSELS ANNOUNCED; 200,000 TONS FOR U. S. STEEL CORPORATION

Fore River Plant Receives Orders for 79,800 Tons—Federal and Chickasaw Yards to Build Twenty Ships—Ten Steel Trawlers, Four Fruit Vessels and Various Cargo Steamers Included in Orders.

The placing of ship contracts during the last month by domestic and foreign commercial interests with American shipbuilders emphasizes the essentially permanent character of this industry in supplying the necessary tonnage for American and foreign operation. Work has started on the construction of twenty steamships of about 10,000 tons each for the United States Steel Corporation at the yards of the Federal Shipbuilding Corporation, Kearny, N. J., and the Chickasaw Shipbuilding Company, Mobile, Ala.

In addition to a 43,200-ton battleship for the United States Navy, the Fore River plant of the Bethlehem Shipbuilding Corporation has received an order for two 12,600-ton steel tankers from the Standard Transportation Company, 26 Broadway, New York. This yard also holds a contract for an 11,400-ton Diesel-engined ore carrier, which will run between Sparrow's Point and Cuba, for the Ore Steamship Company, 111 Broadway, New York. This vessel is one of a fleet of ten which will be built for this service as a part of the $50,000,000 development authorized by Charles M. Schwab for Sparrow's Point.

The East Coast Fisheries Company, 7 Wall street, New York, has placed an order for three steel trawlers with the Portland Shipbuilding Company, South Portland, Me. The engines will be built for these vessels by the Portland Company, Portland, Me. Contracts will soon be announced regarding two additional vessels which the company intends to build to complete the new fleet of ten vessels.

The Newburgh Shipyards, Inc., Newburgh, N. Y., has received a contract to build two 300-foot 10-inch vessels for the Cuyamel Fruit Company, New Orleans, La. These vessels will be twin-screw steamers of steel, having triple-expansion reciprocating engines and three Scotch boilers, with an estimated speed of 15 knots.

The International Ship Building Company, Pascagoula, Miss., it is reported, has received a contract to build six 10,000-ton ships for private interests.

The Pusey & Jones Company, Gloucester, N. J., has received a reinstatement on two 13,000-ton ships ordered by the Emergency Fleet Corporation. Work will be begun upon these vessels at once.

The Manitowoc Shipbuilding Company, Manitowoc, Wis., has received a contract from the Atlantic Fruit Company, 61 Broadway, New York, for two vessels of 3,200 deadweight tons.

The Norwegian-American Line, 8 Bridge street, New York, has placed a contract with Napier & Miller, Glasgow, Scotland, for two 435-foot vessels of 9,000 gross tons. These ships will be constructed to burn either coal or oil as fuel. Parsons turbines will be installed. The same company will build two 7,500-ton cargo vessels equipped with triple expansion engines.

The Downey Shipbuilding Corporation, Staten Island, N. Y., holds a contract from the Coastwise Transportation Company, Boston, Mass., to build a cargo steamer of 7,800 tons deadweight.

The Long Beach Shipbuilding Company, Long Beach, Cal., has received a contract from the California & Mexican Steamship Company for a 300-foot motorship.

Although the rumor has been specifically denied by William Cornfoot, president of the Albina Ship & Engine Company, Portland, Ore., regarding the placing of contracts for four 6,000-ton steel ships at that yard for Scandinavian interests, the report is still current, and it is probable that announcement is delayed awaiting the final signing of the papers.

The Coastwise Shipbuilding Company, Baltimore, Md., we have been advised, is negotiating to build six four-masted schooners; four of these vessels of 2,000 tons deadweight will be constructed for the Inter-American Transportation Company, and two of 1,600 tons deadweight for the Chesapeake & South American Transportation Company.

The Howes Construction Company, Meteghan River, N. S., has received a contract to build a bay steamer for the Valley Steamship Company.

Architect's Drawing of the Rotunda in the New Cunard Office Building

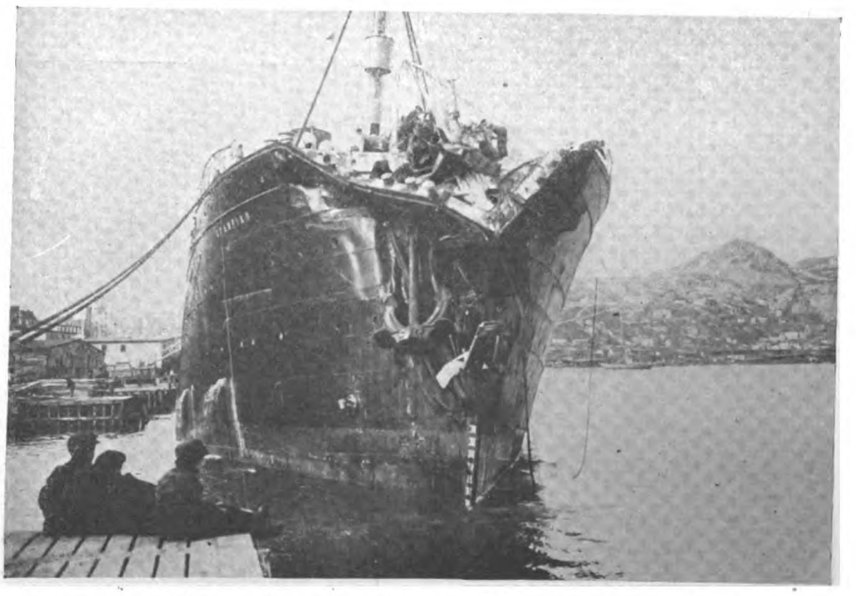
Cunard Company to Build New York Office Structure

The Cunard Steamship Company, Ltd., with which is allied the Anchor Line and the Anchor-Donaldson Line, plans to build a 21-story office building in New York City on a plot of ground adjoining Morris street, bounded by Broadway, Morris and Greenwich streets.

The acquisition of the land has involved the expenditure of $5,000,000. The base area of the building when constructed will be 48,400 square feet. The building is to be completed and ready for occupancy May 1, 1921.

Extensive Refitting by the W. & A. Fletcher Company

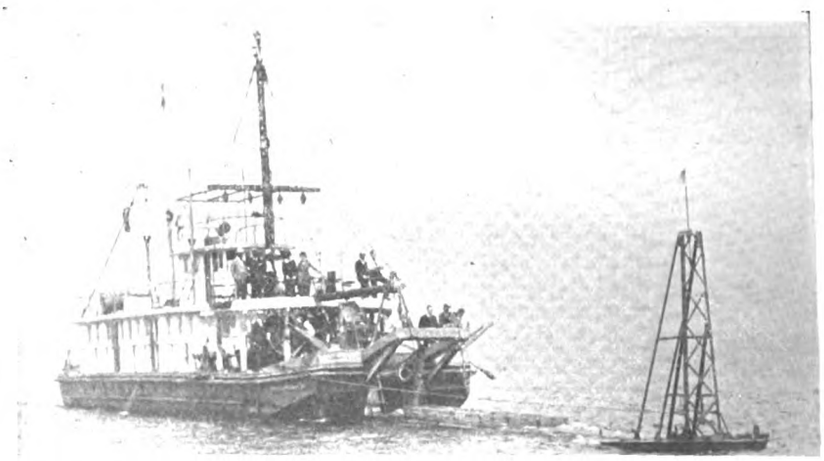
During 1919 the W. & A. Fletcher Company, Hudson street, Hoboken,



The *Grampian*, a Vessel of 6,119 Gross Tons, Which Recently Encountered an Iceberg, is Shown Here as She Was Towed Into Halifax With Bow Torn Out. Realizing the Danger of a Side Blow, the Captain Maneuvered the Boat to Receive the Contact on the Bow

Generated on 2024-09-12 09:04 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

The Engineer Holding the Door of the Diving Compartment Open



The *Argosy and Argonaut* With Half Submerged Submarine Before Her—When Lowered the Latter Rests Over the Ocean Floor

N. J., has refitted twenty-two vessels for troop transport service. The following ships have been handled during that time: *Minnesota, Alaskan, Arcadia, Dakotan, Paysandu, Liberator, Otsego, Virginian, Floridian, Artemis, General Goethals, Santa Anna, Santa Olivia, Santa Cecilia, Santa Rosa, Santa Paula, Radnor, Buford, Philippines, Eten, Ohioan* and *Prince Frederick Wilhelm.*

The *Prince Frederick Wilhelm* was refitted for approximately 4,000 troops in ten days. The fitting of the twenty-two vessels necessitated contract prices amounting to approximately $3,700,000. This work was carried out in addition to the company's usual repair work for the Navy Department, the United States Shipping Board, the Naval Overseas Transportation Service and other work for private owners.

Argonaut Salvage Corporation Formed for Reclamation Work

A $10,000,000 company, known as the Argonaut Salvage Corporation, for carrying on marine salvage work has been incorporated under the laws of the State of Maine by Simon Lake and associates. The first public demonstration of the apparatus, on the working possibilities of which the corporation is based, was given to a group of newspaper and camera men August 1, 1919.

The tests were carried on about six miles out from Bridgeport, Conn., in the waters of Long Island Sound, and consisted in permitting each of the party to walk on the bottom of the Sound at a depth of about 25 feet.

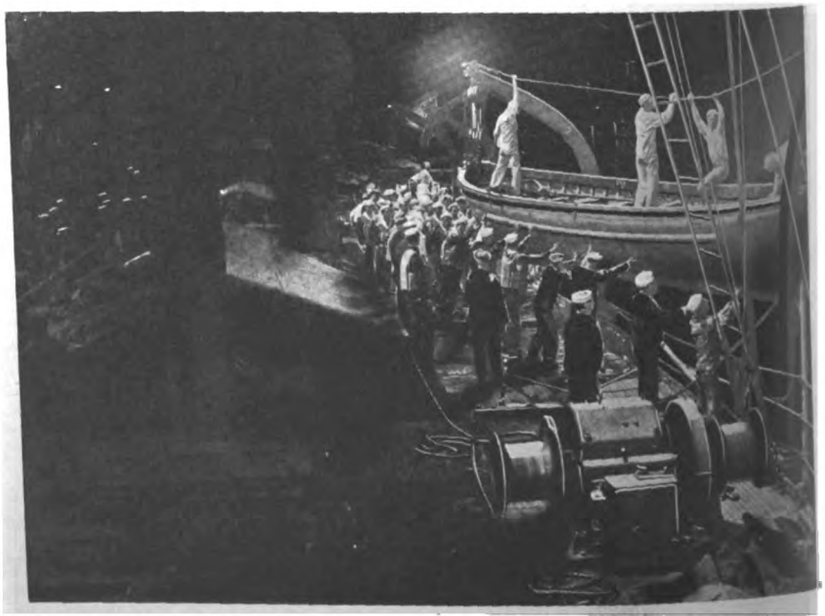
The device, which is one of Mr. Lake's inventions, consists essentially of a mother ship, to which a shaft 4½ feet in diameter is conected by means of a universal joint. At the outer end of the shaft a small submarine chamber, about the shape of a flatiron, is horizontally pivoted. This chamber contains two compartments, one an airlock, which gives access to the shaft, and the other a working chamber. Airtight doors separate the lock from both the shaft and the working compartment. The lock is about 50 square feet in area and 6 feet high, having a hinged floor that, when raised, allows operations to be conducted either on the ocean bottom or on a wreck.

When traveling on the surface, the shaft and submarine extend horizontally from the mother ship, as shown in the accompanying photograph. When operations on a wreck, or on the ocean bed, are to be conducted, the ballast tanks in the apparatus are filled, and the working chamber allowed to sink to the desired depth. The operators then descend through the shaft, which is at a more or less steep incline, depending on the depth of the water, and enter the air lock; after which the doors to the tunnel and working compartment are closed. Air is pumped into the lock until the pressure is equal to that of the water at the given depth. The door to the working chamber is then opened, the floor swung back, and operations conducted without any particular inconvenience other than that due to the limited space.

Matthews Generating Unit for Ship Installation

The launching of a lifeboat after a Shipping Board vessel had been torpedoed, with a Matthews lighting plant flooding lights to davits and deck, is shown in the accompanying illustration. During the war a 6-kilowatt generator, fitted with a specially designed throw-over switch, was furnished to the American International Shipbuilding Corporation, Hog Island, Pa., by the Matthews Engineering Company, Sandusky, Ohio. These 125-volt, direct-current, General Electric generators, ranging in size from 5 to 25 kilowatts, fitted with Matthews four-cylinder, automobile type engines operated with gasoline (petrol), are now being turned out at the rate of two a day from the company's plant for installation in merchant vessels. Batteries and the special automatic switch of the Government type are not furnished with these installations. A second commutator supplies 25 volts for battery charging.

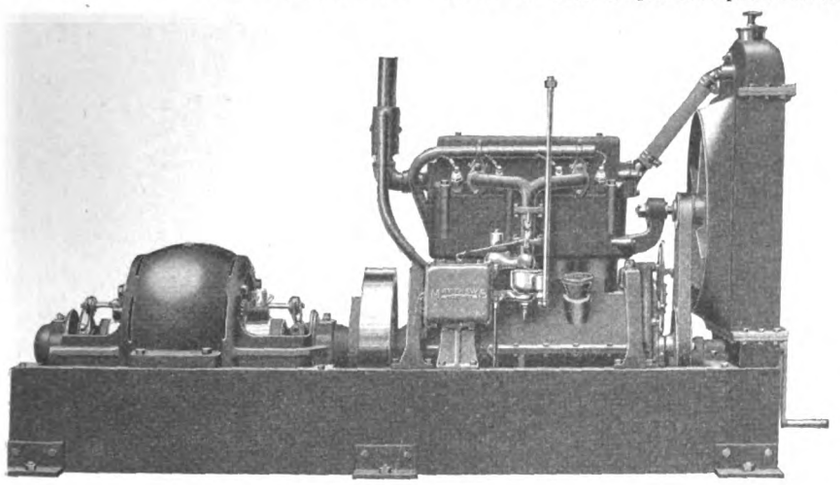
In the special switchboard furnished



Matthews Lighting Plant Flooding Lights to Davits and Deck on Torpedoed Ship

Generated on 2024-09-12 07:59 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

for the Government, when the potential on the ship's mains drops to 85 volts, the throw-over arrangement on the back of the board instantly "throws-over," connecting the wireless and the deck lights with the Matthews generating unit and battery. If the load does not exceed 25 amperes and the batteries are fully charged, the current flows from the batteries to the wireless and deck lights without starting the generating unit. If the load exceeds 25 amperes the current will be supplied until about 20 percent of the battery capacity is consumed; then the generating unit starts automatically and supplies current as long as required. When the potential reaches 110 volts in the ship's mains the auxiliary set is instantly disconnected.



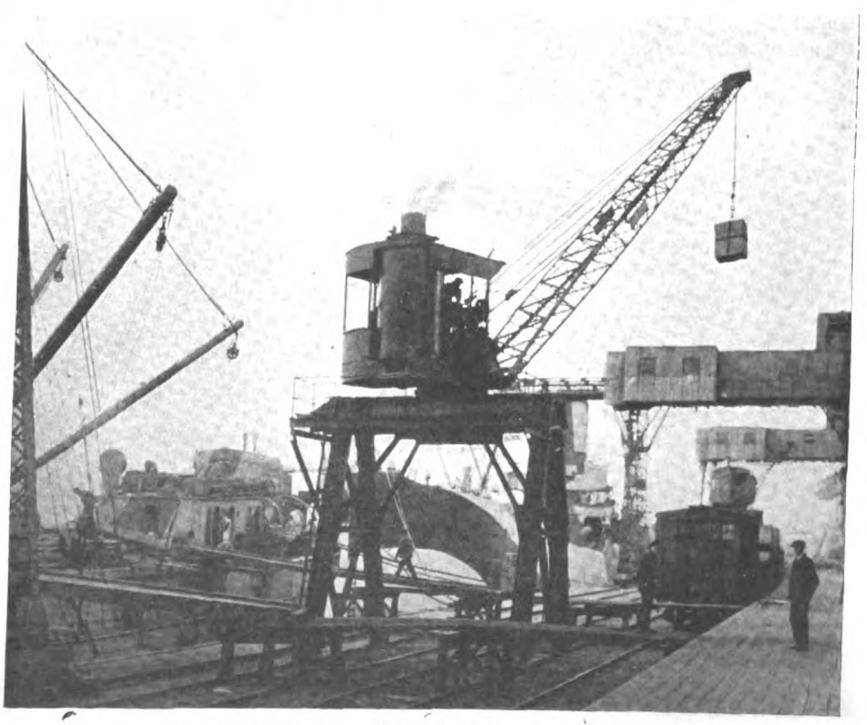
Matthews Six-kilowatt Generating Unit, Generator Side

Brownhoist Wharf Crane Installed at Quebec

The port facilities of the city of Quebec are well suited for the purpose of the cargoes handled at the port, including modern wharf construction, good warehousing facilities, grain elevators and a considerable amount of modern unloading machinery. Among the additional machinery which was installed to handle the increased shipments due to the war, was a Brownhoist wharf crane. The photographs, made by the Brown Hoisting Machinery Company, Cleveland, Ohio, showing the installation, gives an idea of the value of this machinery for harbor work. This machine, which is the usual Brownhoist Portal Pier type operated by steam, travels on rails spaced 15 feet 10 inches on centers. The Portal Pier is of sufficient length to clear any railroad car using the track which runs between its legs.

A hoisting and rotating crane is mounted on the pier. The latter swings in a full circle. The crane boom, which is 55 feet in length, is equipped with a raising and lowering mechanism operated by one man; the rotation of the boom and travel of the crane along the track can also be controlled by one man. These last operations may be performed separately or combined.

When working with a whip line a load of 9,500 pounds can be hoisted at the rate of 250 feet per minute. With the maximum load a hoisting speed of 80 feet per minute can be maintained; rotation with full load may be carried on at the rate of 300 feet per minute. The possibility of combining these two movements cuts the operating time for loading or unloading vessels. At the maximum radius of 55 feet the crane can handle 5,800 pounds; at the minimum radius of 20 feet a load of 23,000 pounds can be handled. The various functions which the crane can perform and the range in lifting capacity which it possesses make it particularly adapted for handling miscellaneous ship cargoes.



Brownhoist Hoisting and Rotating Crane Installed at Quebec

Chrobaltic Alloy for Cast High-Speed Steel Cutters

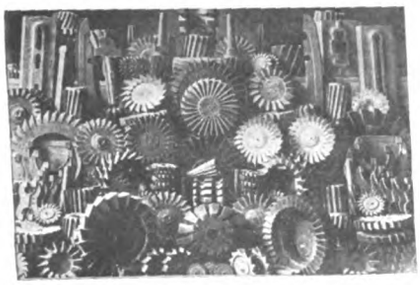
The mechanical and metallurgical arts and sciences, stimulated by war necessities, accomplished remarkable things in the past three years. Among others chrobaltic steel alloy was found to be a suitable substitute for tungsten in producing high-speed steel. In the production and use of multiple cutting edge tools, it is claimed that the use of this alloy has accomplished a saving in material and high-priced labor. It has been successfully used in making tools of intricate shapes, for blanking, drawing and forming dies, hot and cold trimmers, while in the manufacture of cast milling cutters its results seem to be satisfactory. In the cast state tools are supplied either finished, ready for use, or annealed, so they may be machined to special dimensions by the user.

These high-speed steel castings have the appearance of smooth forgings, and are practically non-rusting and acid resisting. The alloy will resist high temperature without flaking, so that it is adapted to cutters having thin edges. The tools may be hardened in air or oil, and annealed and rehardened without the steel losing any of its properties. No change of shape is apparent under heat treatment, so the labor of finishing is greatly reduced. Cutters are cast to nearly the required size, only about one-sixteenth of an inch being allowed for machining before heat treatment. This allowance is reduced, however, so that only a small amount of grinding is necessary for hardening.

The hardening process is carried out in a furnace of the muffle type, where

Generated on 2024-09-12 08:03 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

the tools are heated to between 1,830 and 1,870 degrees F., maintained at this temperature a few minutes, then allowed to drop to 1,815 degrees, when the steel is withdrawn and quenched in oil. The annealing process consists in simply heating to 1,832 degrees, and allowing the material to cool slowly in air. After annealing, the casting should show about



Variety of High-Speed Steel Cutters Made from Chrobaltic Alloy

38 on the scleroscope, and may be machined rapidly.

It would appear from results that the cast chrobaltic alloy cutters disprove the former theory that rolling, pressing or forging is necessary in the production of milling cutters, in order that they might have the required density and toughness.

From data available the labor, cost and material saved in machining processes where these tools are compared with tungsten steel, as well as the labor and material conserved in their manufacture, are apparent. It is noted that in the case of the production of one completed article, when tungsten steel tools were used, ten pounds of material were required and eleven hours of labor, while with chrobaltic alloy it required but five pounds of material and three hours' labor, thus cutting the cost of production about half. The results of a test on shell billets indicate that about a pound more steel was necessary in making the tungsten cutter than the alloy, and that it required seven and three-quarter hours less labor to complete the operations with the latter.

This new alloy is supplied by the Chrobaltic Tool Company, Railway Exchange, Chicago, Ill.

Gilbert & Barker Heating Furnaces

The accompanying illustration shows a portion of the Gilbert & Barker heat treating system installed at the plant of the McClintic-Marshall Company, Pottstown, Pa., one of the largest fabricating shops utilized by the Emergency Fleet Corporation. The furnaces, which are direct fired, are used for heating shapes for rerolling and bending. The heating chambers of these furnaces are 42 feet and 52 feet long, 2 feet 9 inches wide, with an arch of the sloping type, being 1 foot high at the right-hand side and 1 foot 8 inches high at the left-hand side.

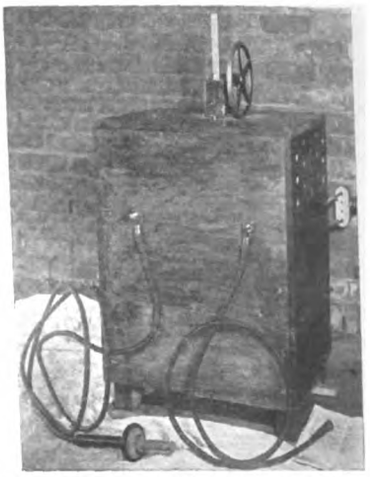
The Gilbert & Barker Manufacturing Company, Springfield, Mass., which manufactures the furnaces, advocates the installation of the 1½-pound pressure air system for general work. The patent adjustable burner, placed about an inch away from the furnace wall, so that approximately 50 percent of the air necessary for combustion is induced, permits the entry of air and oil from opposite sides. The oil enters through a central casting tipped with a cone-shaped cap; the air enters outside of this casting through a cap machined to an angle. The amount of air passing through the burner may be adjusted by means of a special gear arrangement, although the air jet remains the same. A single jet attachment, operating on air at 8 ounces or above, can be furnished for use where nearly constant operating conditions obtain. High-pressure types of burners, suitable for air at 15 pounds or above, and megaphone types for obtaining long, soft flames are also furnished.

Where shaft drive is installed throughout the plant, a positive pressure blower operating at 1½ pounds is used. With this system the oil is furnished by means of a rotary oil pump connected by chain to the shaft of the blower. When electrical current is available, the turbo compressor type of system is by far the most efficient and economical. A turbo compressor is used direct connected with the motor. Down to friction load the horsepower intake is directly proportional to the volume of air taken from the machine. With the positive pressure blower system, however, the blower must be run at full load at all times. In the turbo compressor system the oil is supplied by a motor or belt-driven rotary pump.

The Zeus Welder

The Gibb Instrument Company, Detroit, Mich., has placed on the market a new type of electric welding apparatus known as the "Zeus" welder. The current for welding is provided through a transformer instead of from a motor generator. The transformer has no moving parts to get out of order, and the manufacturers claim that the current consumption is from 20 to 40 percent less than in a motor generator.

The "Zeus" welder is of comparatively small size; portable; can be adapted to overhead welding and to the welding of cast iron. It is built on the unit system, so that whenever work becomes too heavy for the apparatus a

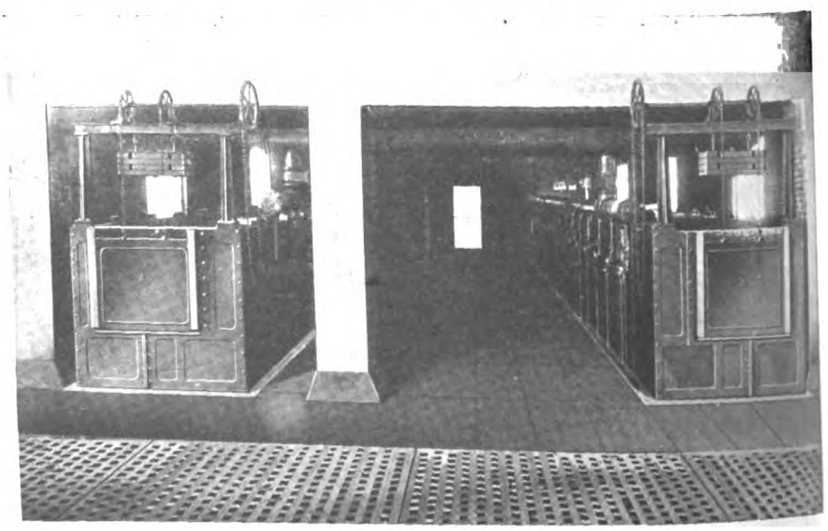


Transformer and Electrodes Which Comprise the Zeus Portable Outfit

duplicate may be connected in parallel with the original machine. A special feature is the arrangement for regulation. A wheel connected with the secondary, and extending through the top of the case raises and lowers the secondary, and provides for the regulation of the current necessary for the different sizes of electrodes. It is claimed that the inherent reactance of the "Zeus" welder automatically stabilizes the arc for different arc lengths.

Portable Propeller Pitchometer

The McNab Company, consulting engineers and manufacturers, Bridgeport, Conn., is placing on the market a portable propeller pitchometer which is manufactured by Dobbie McInnes, Ltd., of London and Glasgow. This appa-

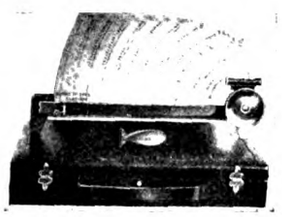


Gilbert & Barker Heating Furnaces Installed at McClintic-Marshall Plant, Which Fabricated Material for the Emergency Fleet Corporation

Generated on 2024-09-12 08:08 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

ratus, which is of very simple construction, may be used for testing the pitch of propellers, both in the shop and on the ship.

For shop testing, lines are drawn on the blade at various radii from the center of the boss, ranging, say, from 2 feet to 20 feet in diameter. The two resting points of the instrument are then placed on the boss, keeping the shifting arm at the bottom of the index plate. The level of the instrument is altered until the bubble is in the center of the slot. From this position the instrument is next transferred to the first pitch

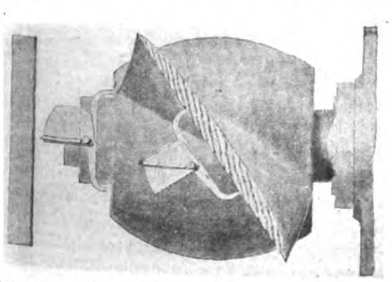


Pitchometer and Case

circle on the blade. Raising the shifting arm, which carries the level with it until the bubble is again in the center of the slot, the pitch can be read at the point where the top edge of the arm intersects the arc line of the index plate marked 2 feet in diameter. The process is repeated for the other radii. The instrument has an extending foot, so that three or four readings may be taken across the blade.

When the propeller is in position on the vessel the operation of the instrument is virtually the same, except that when the feet of the instrument are resting on the boss or nut of the propellers the level is placed at right angles to the shifting arm, which should be placed tightly against the bottom of the index plate. Having adjusted the level with the bubble at the center of the slot the instrument should be transferred to the radii line already scored on the blade; then the arm is shifted without further interference with the level until the bubble is again in the center of the slot. The reading of the pitch may be taken as noted above.

When the propeller is in position in the floating drydock, or erected so that the level is not applicable, the hinged portion of the arm is used for taking the pitch. The company advises the taking of three readings on the breadth when the instrument is used on broad-bladed propellers. This method will give a true mean and also indicate if the pitch is increasing from the cutting to the trailing edge of the propeller blade.



Testing a Propeller When Installed on Ship

When testing propellers of the ram's horn type installed on vessels, where the tips of the blades are thrown back on the round, the instrument should be placed on the down-coming blade, when the center of the smallest diameter line is at right angles to the keel. The engines should then be moved until the center of the second line is at right angles. On further moving of the engine the instrument may be kept in this position, which will secure correct results.

Strainer for Oil Systems

A duplex strainer, designed for installation in the suction or discharge lines of lubricating or fuel oil systems for the removal of solid foreign material in suspension, has been placed on the market by the Griscom-Russell Company, 90 West street, New York. It is stated that the device is also suitable for straining the water supply from rivers and lakes to prevent weeds, sticks, marine plants and small fish from entering the pipe lines.

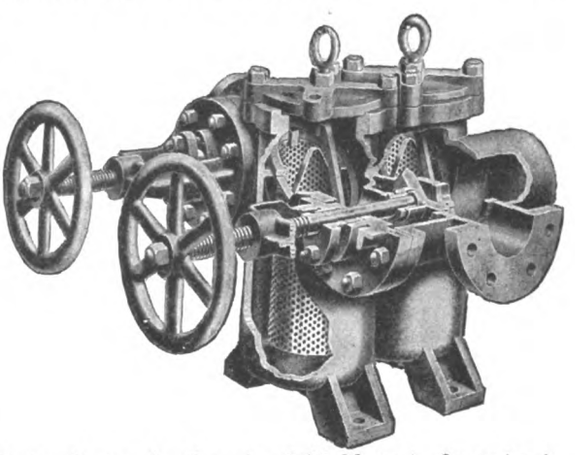
The strainer consists of a cast iron body containing two perforated steel or brass baskets. The valve arrangement permits the removal of either basket for cleaning while the other remains in service. In operation the oil or other liquid enters the inlet connection and passes into the basket in service. The solid matter remains in the basket, the clean liquid passing through the perforations and thence out of the strainer. All cast iron sections are cylindrical to give maximum strength. The valves can be reground.

Red Devil Rivet Cutter

The Red Devil rivet cutter is a pneumatic tool designed solely to cut and back out rivets. The principle of construction is simple—a plunger driven in a long barrel by compressed air striking a chisel head. The efficiency of the tool lies in the tremendous power which it puts behind every blow. One and one-quarter-inch rivets can be cut cold in ten seconds. One-inch rivets can be cut in from three to five blows.

As manufactured by the Rice Manufacturing Company, Indianapolis, Ind., exclusively for the Duntley-Dayton Company, 1416 Michigan avenue, Chicago, the valve head and nose piece are attached to the valve by being forced on under 50,000 pounds pressure. This method of construction provides a solid joining without projections to interfere in close work. High-grade springs placed at each end of the barrel reduce shock and vibration and afford easy operation. All inlet and exhaust valves are curved at an angle which permits the air to enter and leave with the least possible obstruction. An air pressure of 90 pounds, the company reports, will give the best results, although the machine will work fairly well on pressures as low as 40 pounds.

Only three men are required for the operation of the tool. The operator controls the left handle with his left-hand and rocks the valve handle with his right. An assistant holds the chisel on the rivet. At the opening of the air port, by the turning of the valve handle upward, the full force of air acts on the plunger, driving it down the barrel until it strikes the chisel head. On throwing the valve handle down to exhaust, the plunger returns to the head of the tool ready for the next operation. After the rivet is cut it takes but a moment to remove the chisel and insert the backing-out punch. Countersunk rivets are punched through with the latter attachment.



Duplex Strainer for Removing Solid Matter in Suspension in Oil Systems

Oil Forge for Heating Rivets

An oil forge for heating rivets has been devised by J. T. Shepherd, plant plumber for the Pacific Coast Shipbuilding Company, San Francisco, Cal. It is claimed that backfiring is eliminated, and that a higher vaporization of the oil is secured by the use of this forge.

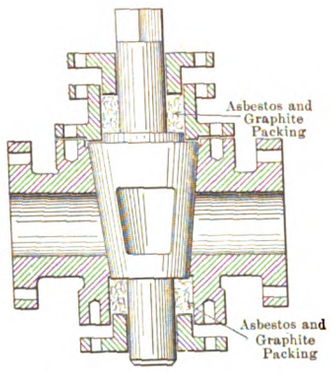
The main features are a valve in the air line and a needle valve in the oil supply pipe, with a mixing chamber formed of a 1¼-inch T, having a 1¼-inch nipple and a bell reducer. A second mixing chamber above the first is formed of a 1-inch ell, supplied with oil from a 1½-inch T and a ⅜-inch nipple injector. Free oxygen is taken in with the vapor. A male hose connection obviates the necessity of using a leader.

Generated on 2024-09-12 07:59 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

In order to reduce the danger of damage to the forge, a stay plate protects the piping where the valves are controlled. The forge is also equipped with bleed valves, making it possible to clean out the tanks easily. Not only can the water be bled from the oil but the bottom of the tank can be blown clean.

Double Packed Stop Cock for High Pressures

A new blow-off valve, especially designed for high pressures, is being produced by the M. H. Treadwell Company, Inc., 140 Cedar street, New York City. It is essentially the taper plug type valve with certain refinements tending to keep it tight in the seat and to overcome sticking. The stop cock must be tight and free from pitting and grooving to prevent leakage. It is advisable to give a cock two or three turns instead of only a half or quarter turn, so that the plug will not wear excessively on one side.



Taper Plug Type Valve for High Pressures

In the case of the new plug, if it is too tight, it may be lifted out, but this should not be done unless absolutely necessary, for there is a chance of getting grit and gravel between the valve and seat. If this occurs the seat will be scored badly and leaking will result.

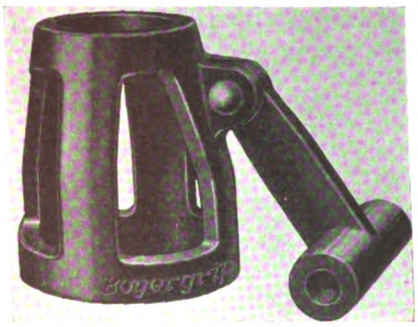
The stop cock is carefully packed on top with soft asbestos and sprinkled with dry graphite, both ends of the packing rings fitting close together. The top gland is then tightened so that the plug will barely turn, after which the bottom is packed in the same manner, the packing being drawn tight enough to release part of the pressure at the top. This equalizing of the pressure will enable the stop cock to turn quite freely.

It is stated that, if handled with ordinary care, this stop cock will never give trouble, as both ends are packed and lubricated and move under the same conditions as a shaft in a lubricated bearing. If the valve sticks when not in operation the gland at the bottom may be screwed up until the cock is released.

Device for Use on Pneumatic Riveting and Chipping Tools

A new attachment, known as the *Boyergrip*, for facilitating the handling of pneumatic riveting, chipping and calking tools, has been produced by the Chicago Pneumatic Tool Company.

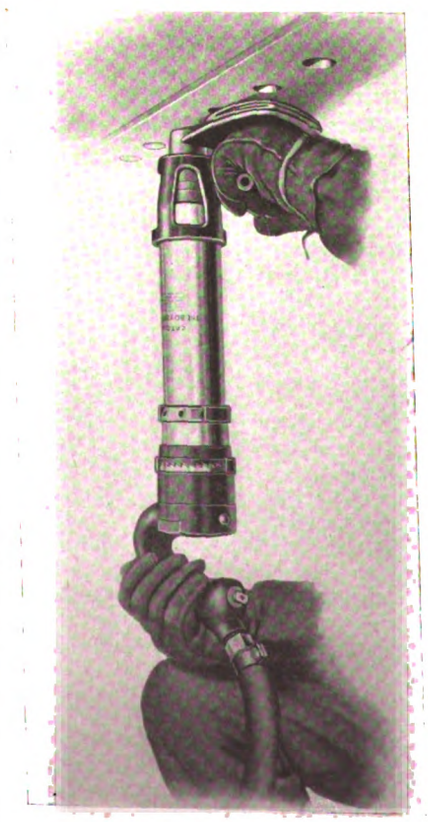
The device fits over the muzzle of most makes and sizes of riveting hammers, to provide the riveter a firm, full hand control of the hammer without grasping the heated cylinder. It is designed with the intention of providing an unobstructed view of the work, as



Device for Hand Control of Hammer Without Contact With Heated Clyinder

well as to eliminate the possibility of jammed or squeezed fingers. Because of this adjustability left-handed and overhead work may be accomplished readily.

On chipping and calking hammers it is claimed that the grip provides a comfortable hand-hold with perfect control at any working angle, as well as protection against the accidental shooting of the chisel and the danger of injury to the hand should the chisel slip from the work.



Device in Use on Close Work

The New Duntley Lock for Air Hammers

Instead of the three parts usually found in locking devices for air hammers, the Duntley lock, recently brought out by the Duntley-Dayton Company, Chicago, Ill., consists of two parts only —a spring locking ring and a lock pin. The new lock, the company claims, is more effective than the old as applied to both the riveting and chipping hammers. It can be easily manipulated when it is necessary to unlock and unscrew or adjust the handle, and is in line with the other improvements which are being made by the Duntley-Dayton Company to simplify the construction of air tools.

Development and Specialization of Rod and Wire Welding Fillers

Vast strides in automobile, railroad and ship construction within the past two years have brought the matter of welding to a position of great importance, for all of the steel industries are dependent on this art. Seven years ago welding, as carried on at present, was practically unknown, and the progress made since then has been largely due to the improvement in fillers.

Sometime ago the Central Steel & Wire Company, of Chicago, caused tests to be made on various steel alloys in the metallurgical laboratories and forge, in order to determine whether the existing use of a single filler for all purposes might be improved. Preliminary investigations led to the adoption of the present convenient form of wire and rod fillers. This was an important change, but the subsequent discovery that wire must be treated differently for electric welding and acetylene welding was even more so.

Swedox was the first special welding material supplied, accomplishing this differentiation. Then it was determined by experiment that a filler used successfully in welding nickel steel, for example, was very inefficient in the case of vanadium steel. Gradually fillers were treated so that they might be used to advantage with practically any steel alloy, until at present there are eight special welding materials available.

Testing Power Losses in Gear Operation

A number of tests have recently been made by a new electrical apparatus perfected by C. M. Allan, professor of hydraulic engineering at Worcester Polytechnic Institute, Worcester, Mass., for detecting small power losses in the operation of gears. The best results were obtained with a mixture of heavy oil and flake graphite. This bears out the claim of the Joseph Dixon Crucible Company, Jersey City, N. J., that flake graphite properly combined with oils and greases, because of its ability to build up microscopic irregularities in gear surfaces, forms a tough film of graphite, which prevents metal to metal contact.

Generated on 2024-09-12 08:05 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Portable Electric Trigger Switch Drills

The Black & Decker Manufacturing Company, 105 South Calvert street, Baltimore, Md., has recently placed two new one-hand drill models on the market. These drills, of 3/16-inch and ¼-inch sizes, are operated by the pistol grip and trigger switch method—a patented feature previously obtainable only in the larger size drills. Through this

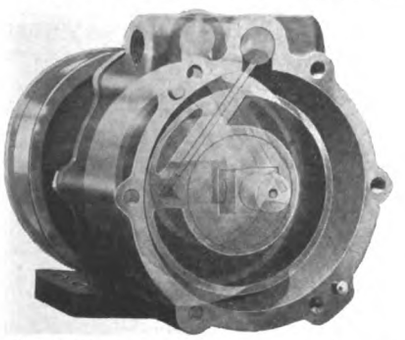
Black & Decker Portable Trigger Drill

mechanism the current is controlled by the trigger without the necessity of changing the position of the hand which holds the drill. This arrangement has the additional advantage of preventing the breakage of drill bits, so often caused by sagging of the drill when the hand of the operator is withdrawn to turn the switch.

These models are furnished with 1/6-horsepower motors with series compensated windings, and may be operated on any current from direct to 60-cycle alternating. Cooling is accomplished by the circulation of air through the housing by means of a vane impeller mounted on the armature shaft.

The Rollway Pump

The accompanying illustration shows the simple construction of the new "Rollway" pump now offered to the trade by the Michigan Machine Company, Detroit, Mich. The working parts



Sketch Showing Mechanism of the Rollway Pump

consist of two rollers which rotate eccentrically in the pump chamber. Since the entire motion is rolling, the inventors claim that wear caused by the scraping of working parts is eliminated. The pump is self-priming; it may be operated at a height 10 feet above the liquid, either water or oil, and under these conditions will prime itself without the use of valves.

This pump may be operated at speeds ranging from 100 to 600 revolutions per minute, upside down or right-side up, and at any point on a machine where its application is most convenient. Either side of the pump may be used for intake or outlet. Where it is necessary to maintain a constant flow in a given direction, regardless of the rotation of the pulley, a pump equipped with reverse valves will be furnished. Standard pumps are furnished with controlling spring to develop 25 pounds pressure at 200 revolutions per minute, 40 pounds pressure at 420 revolutions per minute, etc. Pumps can also be furnished with springs to develop either higher or lower pressures, or without springs where very high pressures are required.

Colonel Watkins Becomes American Manager of Estier Bros. & Company

Col. Robert M. Watkins has assumed the American managership of Estier Bros. & Company, France, one of the oldest and largest steamship agents and stevedores in Southern Europe. When the United States Government in 1918 opened a naval base at Marseilles, and required quick action in unloading vessels carrying supplies, Estier Bros. & Company became the principal contractors. Even at their best, however, European methods of handling ships are not up to the high standard employed by Americans, and it is the intention of Colonel Watkins, as soon as he has contracted for sufficient American business, to make an extended tour of French and North African ports to install American supervision there.

Colonel Watkins, a Spanish-American War veteran, was director of operations at the United States Army Base located at Marseilles. As a civilian he has been engaged in the stevedore business, and for many years was superintendent of the Osaka, Shosen & Kaiska work on Puget Sound. The New York office of the company is at 2 and 4 Stone street.

BUSINESS NOTES

Watson K. Mawby, formerly naval architect for the Electric Welding Company of America, has become associated with the S O S Welding Corporation, 235 Sixth street, Brooklyn, New York, in a similar capacity. The company is now building several all welded steel boats for harbor work.

F. S. Eggleston, Jr., has been appointed manager of the New England branch of the Keller Pneumatic Tool Company, Grand Haven, Mich. The offices will be located at 259 Franklin street, Boston, Mass.

N. E. McClelland & Company, Ltd., naval architects, marine engineers and ship brokers, has located a new office at 2-4 Stone street, New York. Benjamin P. Young will be associated with Messrs. McClelland & Company, Ltd.

The Northwest Engineering Works, Green Bay, Wis., has opened a New York office, Room 539, 149 Broadway. A. C. Rimmer will act as representative here.

A firm of consulting mathematicians has been organized, with offices at 500 West 116th street, New York City, to extend to the industrial world the resources of modern pure and applied mathematics. The organization will be known as Dantzig, Pfeiffer & Ritt. Dr. Dantzig, a graduate of the University of Paris and of the Ecóle Supérieure d'Aéronautique et de Construction Mécanique, has taught at Columbia and at the Indiana University, and during the war was in charge of the mathematical work of the instrument section of the United States Ordnance. Dr. Pfeiffer, of Stevens Institute of Technology and Columbia University, has instructed in mathematics in Harvard, Princeton and Columbia. Dr. Ritt, also a Columbia man, was connected for three years with the Naval Observatory and taught mathematics at Columbia. He was one of the chief ballisticians in the United States Ordnance during the war.

Sergeant Paul Mitchell, who was stationed with the Provisional Supply Depot, American Expeditionary Forces, France, during the war, has returned to Chicago, and resumes his position as traveling representative for the Independent Tool Company, 600 West Jackson Boulevard, Chicago, Ill.

The John E. Hand & Sons Company, Haddonfield, N. J., has announced the opening of a store for the sale of nautical instruments at 114 West Plume street, Norfolk, Va., under the management of Edwin W. Lodge.

At a recent meeting of the board of directors of the Foundation Company, 233 Broadway, New York, Franklin Remington was elected chairman of the board, John W. Doty was made president of the company, and H. J. Deutschbein, vice-president and general manager.

Chicago Pneumatic Erects Office Headquarters in New York

The Chicago Pneumatic Tool Company plans moving its general offices from Chicago to New York, and toward this end is erecting an office building at 6-8 East Forty-fourth street, New York City.

The structure, built by the Westinghouse-Church-Kerr Company of combination steel, brick and limestone, will comprise, initially, ten stories, all to be occupied by the company. The ground floor is to be a permanent exhibition room, containing a display of the Chicago Pneumatic Tool Company's products. In conjunction, a completely equipped service station will be maintained. The new building is to be ready for occupancy early in 1920, at which time the transfer will be effected.

Generated on 2024-09-12 08:04 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Brooklyn Polytechnic Institute Offers Evening Courses in Marine Engineering

The Brooklyn Polytechnic Institute, 85-99 Livingston street, Brooklyn, N. Y., has just announced that courses in marine engineering, ship drafting and yacht design will be opened the last of this month for those desiring instruction in these branches. These courses are laid out especially to meet the demand for professionally trained men in this field. They give students comprehensive training, so that on entering a shipyard or ship-drawing office they will understand what is required of them and how to proceed in accomplishing it.

The training is also valuable for those engaging or expecting to be engaged in any shipping activity, such as vessel brokerage, forwarding, or the business of shipping agencies or steamship companies, since the instruction includes calculation of carrying capacity, fuel requirements per voyage, economical repair and drydocking, as well as a thorough knowledge of the design, construction, repairs and operation of all types of vessels and the machinery installed upon them. The numerous shipyards in New York offer opportunities for students seeking employment or desiring to supplement their theoretical work with practical training.

The course in yacht design should prove especially valuable to yachting enthusiasts, since it will give them an expert's knowledge of all kinds of yachts, both sail and power, with the relative merits or demerits of various types and the reasons therefor. It will enable them to design and draw up complete a sailing yacht or motor boat of their own choosing under skilled guidance. This course includes points of naval architecture not taken up in the ship drafting course. It is arranged to be taken alone, but students of the marine engineering and ship drafting courses may also take it to advantage. Additional and advanced courses leading to the degree of Bachelor of Science in naval architecture and marine engineering may be offered later.

PERSONALS

Holder A. Evans, president of the Baltimore Dry Docks & Shipbuilding Company, left for Europe August 14 to be absent from this country until October. Mr. Evans expects to make a thorough survey of shipbuilding plants in Great Britain, Norway, Sweden, France, Denmark and Italy.

Antonia C. Pessano, chairman of the board of directors of the Great Lakes Engineering Works, and a director of the American Bureau of Shipping, has been elected a director of the American Merchant Marine Insurance Company.

Winthrop L. Marvin has been engaged by the American Steamship Association for special work to be carried on by that association.

Capt. J. H. Rinder, nautical advisor of the Pacific Mail Steamship Company, and C. W. Cook, formerly chief traffic manager of the American-Hawaiian Steamship Company in San Francisco, have formed the partnership of Rinder & Cook, to conduct a business of marine surveying, brokerage and steamship operation on California street, San Francisco, Cal.

Louis C. Eitzen, formerly general manager of the August Meitz Corporation, New York, is now associated with the Pittsburgh Filter & Engineering Company as vice-president and general sales manager, with offices located at 280 Broadway, New York City. For six years previous to his affiliation with the August Meitz Corporation in 1917,

Louis C. Eitzen, Vice-President of the Pittsburgh Filter & Engineering Company

Mr. Eitzen was sales and electrical engineer of the Standard Underground Cable Company, Pittsburgh, Pa. He has also been associated with the electrical Testing Laboratories of New York City and with the Bristol Instrument Company, Waterbury, Conn. He is an engineer graduate of Cooper Union and a law and accounting graduate of Pace Institute. In addition to this technical training in the engineering and business professions, including several years in very close study of oil engine engineering practice, Mr. Eitzen has recently specialized in matters relating to organization and administration, particularly along manufacturing and commercial lines, which will now be applied to the development of the oil engine business of the Pittsburgh Filter & Engineering Company.

W. L. Parrish has been appointed general freight and passenger agent for the Baltimore Southern Navigation Company. J. K. Tunis will relieve C. J. Rivenbark as Baltimore agent when Mr. Rivenbark becomes publicity manager of the company.

A. Matthew, prominent in Seattle, Wash., shipping circles, has become one of the owners of the Universal Shipping & Trading Company.

E. A. Plunkett has resigned his position with the Shewan Drydocks to become manager of Ira S. Bushey & Sons, Inc., Brooklyn, N. Y.

Paul H. Macneil, resident engineer of the United States Shipping Board Emergency Fleet Corporation stationed at Savannah, Ga., has resigned his position to become associated with the Crandall Engineering Company, Boston, Mass., to be engaged in drydock construction work. Mr. Macneil's first work in this new capacity will be undertaken at the Bruce drydock, Pensacola, Fla.

Commander S. M. Robinson, United States Navy, has been appointed fleet engineer of the Pacific fleet, and will be stationed on the United States battleship *New Mexico*.

B. E. Meurk, chief engineer of the Ship Division of the Tennessee Coal & Iron Railroad Company, will be located at the company's works in Fairfield, Ala., in connection with the Chickasaw Shipbuilding Company, Mobile, Ala.

Karl B. Roebling, president of John A. Roebling & Sons Company, has been elected a director of the American Ship & Commerce Corporation, the merger formed by the William Cramp & Sons Ship & Engine Building Company and the Kerr Navigation Company.

W. F. Gibbs, designer of the new 1,000-foot vessels which the United States Shipping Board plans to build, has sailed for Europe. It is reported that Mr. Gibbs will consult with leading British naval architects.

P. A. S. Franklin, president of the International Mercantile Marine Company, has returned to Europe to complete routine business of the company which was interrupted by his return to America in connection with the British ship deal.

OBITUARY

Daniel J. Kennedy, works manager of the Kennedy Valve Manufacturing Company, died on June 16.

George Elmer Miles, treasurer of the Newport News Shipbuilding & Dry Dock Company, Newport News, Va., died at his home at the Sherman Square Hotel, New York, on August 20. Mr. Miles, after preparing for West Point, entered his business career as a newspaper reporter on the *Tribune*. For a long time he was intimately associated with Horace Greeley, traveling with him on political tours. More recently he served as the secretary of Colin P. Huntington, and through this connection became associated with the Newport News Shipbuilding & Dry Dock Company.

Generated on 2024-09-12 08:02 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Marine Construction News of the Month

Ship Contracts—New Ship Concerns and Shipyard Improvements—Terminal Projects—Government Contracts

SHIP CONTRACTS

The Albina Ship & Engine Company, Portland, Ore., it is said, has received a contract to build four 6,000-ton steel ships at that yard for Scandinavian interests.

The Aluminum Company of America, Pittsburgh, Pa., is building through one of its subsidiary companies four-steel vessels of 4,000 tons capacity. The company plans eventually to build a fleet of ten vessels to carry ore from the British, French and Dutch Guianas. The company will also secure barges and towboats for river service between St. Louis and Baton Rouge.

The American Shipyards, Lake Washington, Wash., has received word from Christofer Hannevig, Inc., New York, to complete the two 3,250-ton motorships upon which work had been previously suspended.

The Bethlehem Shipbuilding Corporation, Bethlehem, Pa., will construct the battleship No. 54, to be named the Massachusetts, at its Fore River plant. This ship, which is the last of the authorized battleships to be contracted for, will have a displacement of 43,200 tons.

This company has also received an order for two 12,600-ton steel tankers to be constructed at the company's Fore River plant for the Standard Transportation Company, 26 Broadway, New York. The company has also received a contract for one 11,400-ton ore carrier from the Ore Steamship Company 111 Broadway, New York. The vessel is one of the fleet of ten which will be built for this service, as part of the $50,000,000 development authorized by Charles M. Schwab, for Sparrow's Point.

The Chickasaw Shipbuilding Company, Mobile, Ala., has received a contract to build 8 10,000-ton cargo carriers for the United States Steel Corporation.

The Downey Shipbuilding Corporation, Staten Island, N. Y., holds a contract from the Coastwise Transportation Company, Boston, Mass., to build a cargo steamer of 7,800 tons deadweight. The vessel will be 396 feet overall, 381 feet between perpendiculars, molded beam 52 feet, depth 30 feet.

The East Coast Fisheries Company, 7 Wall street, New York, has placed an additional order for three steel trawlers with the Portland Shipbuilding Company, South Portland, Me. The engines will be furnished by the Portland Company, Portland, Me.

The Federal Shipbuilding Company, Kearney, N. J., has received a contract to build 12 10,000-ton cargo carriers for the United States Steel Corporation.

The Longbeach Shipbuilding Company, Long Beach, Cal., has received a contract from the California & Mexican Steamship Company for a 300-foot motorship with accommodations for fifty passengers.

The Los Angeles Shipbuilding & Dry Dock Company, Los Angeles Cal., it is reported, has received a reinstatement on five vessels. The previous contract called for 8,000-ton vessels. Vessels of 12,000 tons, it is said, are now to be built.

The Manitowoc Shipbuilding Company, Manitowoc, Wis., has received a contract from the Atlantic Fruit Company, 61 Broadway, New York, for two vessels of 3,200 deadweight tons.

Weaver & Son, Orange, Tex., is constructing two 80 by 24 feet barges for the Gulf Refining Company. The **Garden City,** a towboat of the D. W. Ryan Towboat Company, Houston, Tex., is also being rebuilt at this yard.

PROSPECTIVE SHIP CONSTRUCTION

Electrically Propelled Vessel of 15,000 Tons.—The White Flyer Steamship Line, San Francisco, Cal., W. S. Scammel, general manager, plans to build a 24-knot passenger vessel of 15,000 tons displacement which will be propelled by electric power. The estimated cost of the vessel is announced as $1,500,000.

Ferryboat, Wilmington, N. C.—The city of Wilmington, N. C., is in the market for a ferryboat. The commissioners have not been able to obtain a vessel already built, and so are planning to construct the boat in a New York shipyard. About $40,000 will be spent. W. P. McGlaughon, W. E. Yopp and Addison Hewlett represent the committee in charge of the work.

Ore Carriers of 4,000 Tons.—The Aluminum Company of America, Pittsburgh, Pa., plans to operate 10 ore carriers of 4,000 tons capacity. Contracts for four of these vessels have already been let.

Ship Canal Dredges.—The Universal Shipbuilding Company and the Midland Bridge Company, Houston, Tex., have submitted bids for the construction of four dredges to be used in widening and deepening the Houston Ship Canal, as provided by Government appropriation funds.

Steamers.—The St. Helens Shipbuilding & Dry Dock Company, St. Helens, Ore., it is reported, will build several steamers. A recent fire at this yard inflicted a $15,000 damage to the steamer Colindo on the ways.

Stern-Wheel Steel Towboat.—The Mississippi River Commission, first and second districts, Custom House, Memphis, Tenn., wishes to secure a stern-wheel steel towboat. Proposals will be received until September 2.

Car Barges and Passenger Steamers.—The Canadian Pacific Railroad, according to a statement made by Captain J. W. Troup, manager of the British Columbia coast service, is considering the building of several car barges and passenger steamers.

River Packets.—The Liberty Transit Company, which operates a fleet of packets on the Ohio River, plans to place additional boats in the service. No specifications have been issued.

Steamships for Mexican and South American Service.—The Ocean Mail Steamship Company, San Francisco, Cal., organized by Oliver J. Olson to carry on trade between San Francisco, Mexico and South America, plans to build three or four new vessels for the service.

Twenty-Knot Passenger Vessel and Several Smaller Vessels.—The Matson Navigation Company, San Francisco, Cal., we are advised, will place orders in the near future for one large 20-knot passenger steamer and several smaller passenger and freight steamships of slower speed. W. P. Roth is the vice-president and general manager.

NEW SHIP CONCERNS AND SHIPYARD EXTENSIONS

Boiler Works, Menasha, Wis.—The Menasha Boiler Works, Menasha, Wis., was recently incorporated, with a capital of $50,000, to engage in general boiler and structural business. William J. Hess, William A. Bruce and Arthur Strange are the incorporators.

Coaling Dock, Southport, N. C.—The Liberty Shipbuilding Company, Lewis R. Ferguson, general manager, Wilmington, N. C., is constructing a $300,000 coaling station on the waterfront at Southport, N. C.

Concrete Shipbuilding Company, San Francisco, Cal.—The Concrete Barge & Ship Company, San Francisco, Cal., has been organized by R. R. Culp and William Hodge to build barges. Construction will be in charge of N. C. Nicolsen, who was superintendent of the San Francisco Shipbuilding Company. The engineering problems of the new company will be handled by Earle Russel, who also comes from the San Francisco Shipbuilding Company, and gained further experience in the construction of the 7,500-ton tankers now being built on Government Island in the Oakland estuary. The company has a site on the estuary.

Construction Buildings and Shop Equipment, Bay City, Mich.—Following the fire at the Defoe Boat & Motor Works, Bay City, Mich., on July 23, the site was immediately cleared and new machinery put into operation. New buildings are now being erected and the plant will be working as usual in a short time.

Drydock, Champlain, Que.—About $207,000 is being spent in building a drydock at Champlain, Que.

Drydock, Prince Rupert, B. C.—The Prince Rupert Dry Dock & Engineering Company, Prince Rupert, B. C., is constructing a 20,000-ton drydock, 600 feet long. It will be built in three sections, which will be capable of independent action.

Marine Railway, Chelsea, Mass.—The Winnisimmet Shipyard, Inc., Chelsea, Mass., has begun the construction of a 3,500-ton railway drydock, including retaining walls and wharves which will be used in conjunction with it. This is the eighth drydock of the railway type to be constructed in Boston harbor. The Crandall Engineering Company, East Boston, Mass., is the designer and builder of the drydock.

Outfitting Dock, Suisun Bay, Cal.—The Pacific Coast Shipbuilding Company, Suisun Bay, Cal., is adding a 250-foot extension to its fitting-out wharf. The addition will bring the total length of the wharf to 700 feet.

Ship Equipment Firm, Brooklyn, N. Y.—The Neptune Boiler & Machine Works, Inc., Brooklyn, N. Y., has been organized with a capital of $50,000 for building ocean vessels. J. C. Wilcox, F. B. Johnson and M. J. McDade, 434 Forty-ninth street, Brooklyn, are the incorporators.

Ship Machinery Company, Toronto, Can.—The H. A. Wood Manufacturing Company, has been incorporated by Melvin G. Hunt, and George H. McArthur, 12 Spaulding avenue, Toronto, Ont., with a capital of $1,000,000, to manufacture valves and ship machinery.

Railway Drydock, Norfolk, Va.—Work will soon be begun upon the 4,000-ton marine railway which the Colonna Marine Railway Corporation, Norfolk, Va., is constructing. The dock has been designed by the Crandall Engineering Company, East Boston, Mass. This company will also handle the construction work.

Ship Operation Corporation, Montreal, Canada.—The Robert Redford Company, Ltd., Montreal, Quebec, was recently incorporated, with a capital of $1,000,000, to engage in the operation of ships. Aubrey H. Elder, Felix W. Hackett, D. Burley-Smith and others are the incorporators.

Ship Repair Company, New York.—The Harbor Boat Repairing Corporation, New York, was recently incorporated, with a capital of $5,000. C. E. Malmo, J. C. Duke and B. B. Mead, 1999 Washington avenue, New York, are the incorporators.

Ship Salvage Company, Montreal.—The British Wrecking & Salvaging Company, Montreal, Que., was recently chartered to build ships, boats, etc. The company is capitalized at $2,000,000. Richard T. Heneker, Henry N. Chauvin, Harold E. Walker and others are the incorporators.

Ship Salvage Corporation, Bridgeport, Conn.—The Argonaut Salvage Corporation, Bridgeport, Conn., has been incorporated under the laws of the State of Maine, with a capital of $10,000,000, by Simon Lake and associates to carry on marine salvage work. The company has perfected apparatus which permits the salvage of sunken ships or their cargoes at a depth of at least 100 feet without the use of divers, etc.

Shipbuilding Company, Boston, Mass.—I. H. Bogart & Son Shipbuilding Company, Boston, Mass., was recently organized, with a capital of $25,000. Wm. M. Bogart, E. M. Simmonds, M. I. Brooks and others are the incorporators.

Shipbuilding Company, Beaufort, N. C.—A new shipbuilding company, to be known as the American Shipbuilding & Dock Corporation, has about completed a shipyard two miles south of Beaufort, N. C., for the construction of concrete barges. About $500,000 has already been invested in equipment at this plant. R. C. Horne, Beaufort, is president of the corporation; W. E. Richardson, vice-president of the Beaufort Bank, is treasurer, and F. C. Heard is manager.

Shipbuilding Company, Camden, N. J.—The American Shipyard Company, foot of Division street, Camden, N. J., has been incorporated, with a capital of $100,000, to engage in the building of ships, etc.

Generated on 2024-09-12 07:52 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Shipbuilding and Shipoperating Company, Wilmington, Del.—The Ballymena Company has been incorporated at Wilmington, Del., with a capital of $100,000, to build and operate boats. The incorporators are W. F. O'Keefe, George G. Steigler and J. W. Dodwell, of Wilmington.

Shipyard, Belfast, Ireland.—Harland & Wolff, Belfast, Ireland, have just completed a new shipyard on the Musgrave Channel, where the first vessel to be laid is of the N class, built on the straight frame fabricated system similar to other 6,500-ton vessels built in English yards. The new yard will have six building berths and a frontage of 900 feet.

Shipyard, Charleston, S. C.—The Charleston Dry Dock & Ship Repair Company, it is reported, will locate a large repair plant and shipyard at Remley's Point, Charleston, S. C. This company has been incorporated under Delaware laws, with a capital of $2,225,000. Robert M. Reid, 24 Broad street, New York, the incorporating lawyer, reports that details will soon be available regarding the project.

Shipyard, Portland, Me.—The Job Shipyard Corporation, Portland, Me., has purchased the yard of the Machias Ship Construction Company, which was equipped by the United States Shipping Board Emergency Fleet Corporation. On the four ways which are available, the company has begun the construction of two vessels. The yard is also equipped for the repairing of all classes of wooden vessels. The following men are in charge of the company: W. C. Job, president; R. Job, vice-president; John R. Fox, second vice-president; Robert Badcock, treasurer; Glenn R. Eudaley, secretary.

Shipyard Extension, Groton, Conn.—The New London Ship and Engine Company, Groton, Conn., has built a $25,000 addition, 60 by 70 feet, which will be used in the further production of marine engines.

Shipyard Extension, Clyde, Contra Costa County, Cal.—The Pacific Coast Shipbuilding Company, Suisun Bay, Cal., has completed the city of Clyde, Contra Costa County, Cal., to house the shipbuilders employed at the company's yards.

GOVERNMENT SHIPYARDS FOR SALE

Shipbuilders' Housing Development for sale, St. Helena, Md.—On August 4, bids were closed for the St. Helena housing project, composing 296 houses and a cafeteria building and power house. This development is about ten minutes' trolley run to the Sparrow's Point plant of the Bethlehem Shipbuilding Corporation, Sparrow's Point, Md.

Wooden Shipyard for Sale, Cornwells, Pa.—The Traylor Shipbuilding Corporation, Cornwells, Pa., has been put up for sale by the United States Shipping Board. At this yard were constructed eight 3,500-ton vessels of the Ferris type. These yards front on a deep wide basin and extend at the rear to the Pennsylvania Railroad, covering an area of about 80 acres. Concrete shops and wooden and concrete housing accommodations are built upon the premises. There is abundant possibility for enlargement of the yards.

Wooden Shipyard, Tools and Equipment for Sale, Raymond, Wash.—Bids will be received until September 10, at the office of the district manager, 607 Securities building, Seattle, Wash., or at the office of the manager of the Shipyard's Plant Division, 140 North Broad street, Philadelphia, Pa., for the sale of the corporation's shipbuilding plant at Raymond, Wash., operated by Sanderson & Porter. Tools and equipment are included.

EQUIPMENT

Derrick Crane, Mobile, Ala.—The city of Mobile is installing a derrick crane on the municipal docks to handle the steel containers which are being built for the Warrior River barge canal system.

Freight Handling Equipment, St. Louis, Mo.—C. E. Smith, Railway Exchange Building, St. Louis, Mo., may be addressed concerning the installation of freight handling equipment at the St. Louis municipal terminals.

Line Throwing Guns and Outfits.—On July 30, the Shipping Board reopened bidding on 900 line throwing guns and outfits, to be taken in lots as required. The guns must be of a type approved by the United States Steamboat Inspection Service. They may be of either steel or bronze.

Marine Engines, Portland, Me.—The Portland Company, Portland, Me., has received a contract to supply the engines for three steel trawlers being built for the East Coast Fisheries Company.

Marine Engines and Auxiliary Equipment, San Francisco, Cal.—The Union Gas Engine Company, San Francisco, Cal., has received a contract to construct eighteen 300-horsepower, four-cylinder, heavy duty marine engines and auxiliary equipment for nine concrete towboats which are being built on the Atlantic coast.

Mechanical Stokers and Turbo-alternator, Charleston, S. C.—The Bureau of Yards and Docks, Navy Department, Washington, D. C., plans to instal mechanical stokers to cost about $11,000, and a turbo-alternator to cost about $50,000 in the central power plant, Charleston, S. C.

Outfitting Vessels, Providence, R. I.—The Lord Construction Company, Field's Point, Providence, R. I., has received a contract to outfit four 5,000-ton vessels for the Emergency Fleet Corporation. These ships are being constructed at the yards of the Bayles Shipbuilding Corporation, Port Jefferson, L. I.

Steel Containers, Warrior Barge Canal.—Henry de Bardeleben, Federal manager of the Warrior River system, has recently announced that 500 more steel containers have been ordered to handle the 10,000 tons of freight which will soon be carried on the Warrior River barge canal per month.

PROPOSED CONSTRUCTION

Boat and Storage Building, Philadelphia, Pa.—The Bureau of Yards and Docks, Navy Department, Washington, D. C., plans to build a boat and storage building at Philadelphia, Pa. Cranes will be installed.

Drydock, Brooklyn, N. Y.—The Bureau of Yards and Docks, Navy Department,, Washington, D. C., plans extensive repairs of drydock No. 4, New York, to cost about $100,000.

Dry Dock, Victoria, B. C.—The contract will be let in October for the construction of the Esquimalt drydock at Victoria(, B. C., according to a statement by Dr. S. F. Tolmie, M. P., Victoria.

Drydock Pontoons, Savannah, Ga.—The Terry Shipbuilding Corporation, Savannah, Ga., is planning to construct two more pontoons to form the complete sectional drydock to be operated at Savannah. The company has just completed the construction of its fourth pontoon.

Harbor Improvements, Fort William, Ont.—The Dominion Government is about to let a contract for extensive harbor improvements at Fort William, Ont., to cost about $200,000. R. C. Desroches, Department of Public Works, Ont., is the secretary.

Harbor Improvements, Glace Bay, N. S.—About $50,000 will be spent in harbor improvements at Glace Bay, N. S. R. C. Desroches, Department of Public Works, Ottawa, Ont., is secretary.

Harbor Improvements, Port Dover, Ont.—About $50,000 will be spent in the improvement of the harbor at Port Dover, Ont. Address E. Lafleur, Department of Public Works, Ottawa, Ont.

Harbor Improvements, Quebec, Que.—About $56,000 will be spent in improving the Charles river, at Quebec. Address E. Lafleur, Department of Public Works, Ottawa, Ont.

Harbor Improvements, St. John, N. B.—Harbor improvements will be made at St. John, N. B., to cost about $55,800. R. C. Desroches, Department of Public Works, Ottawa, Ont., is the secretary.

Lumber Piers, Fairfield, Md.—The Weyerhaeuser Timber Corporation, Everett, Wash., will construct four large lumber piers on a 76-acre site at Fairfield, Md. James E. Long, the Baltimore representative, may be addressed, care of George R. Willis, 213 Cortland street, concerning the project.

Ore Terminal, Baton Rouge, La.—The Aluminum Company of America, Pittsburgh, Pa., plans to build a large ore terminal at Baton Rouge, La. Barges carrying ore and freight to and from St. Louis will transfer their cargoes to ocean vessels at this point.

Pattern Shop, Norfolk, Va.—The Bureau of Yards and Docks, Navy Department, Washington, D. C., is planning the erection of a pattern shop at Norfolk, Va., to cost about $500,000.

Pier, Avondale, La.—The Oceanic Repair Company, Avondale, New Orleans, La., plans to build a 1,000-foot pier to be used in the exportation of oil.

Pier and Warehouse, Wilmington, N. C.—The Fisheries Products Company, Wilmington, N. C., is planning to construct a small warehouse and dock on Cape Fear river, to cost about $10,000. George W. McKown is the superintending contractor.

Piers, New York City.—The Sinking Fund Commission has finally authorized the building of fourteen new piers at a cost of from $15,000,000, to $20,000,000. This construction includes the building of eight piers between Arrieta and Canal streets, Staten Island., and four piers south of Canal street, at Stapleton, S. I. These piers will be 1,000 feet long, 125 feet wide, with 300 foot slips, each covered with a one-story steel shed. Piers 3, 4 and 5, North River, two of which will have to be purchased from private owners, are also to be rebuilt. The leases will run for ten years with the privilege of renewal for a like period at an annual rate of 7½ percent of the cost of construction for each pier.

R. P. Betts, deputy chief engineer, Department of Docks, New York City, has announced that the handling equipment would consist of cargo masts only. Plans for the construction of some of these piers are nearing final approval.

River Terminal, Memphis, Tenn.—The River Terminal Commission, Memphis, Tenn., is planning extensive river terminals to facilitate the handling of freight on the Warrior Barge Canal. Funds to the amount of $270,000 are now available for this work. Authorization has been granted for a referendum vote on a $500,000 additional bond issue. W. S. Schoulz, Chamber of Commerce, Memphis, Tenn., is the consulting engineer.

Shipyard Addition, Fairfield, Md.—The Union Shipbuilding Company, Fairfield, Md., plans to make substantial additions to its plant.

Shipyard Extensions, Bremerton, Wash.—In the naval appropriation bill the Senate approved the following items for the Puget Sound Navy Yard: Railroad extension, $50,000; 20-ton floating crane, $50,000; grading filling and sea wall, $350,000; additional storage building at the naval magazine, $40,000; power plant at the naval magazine $15,000; quarters for female nurses at the naval hospital, $40,000.

Terminal, Havana, Cuba.—The Atlantic, Gulf and West Indies Steamship Lines, 11 Broadway, New York City, is drawing up tentative plans to build a large terminal at Havana, Cuba, to cost from $2,000,000 to $3,000,000.

Terminal Development, Baltimore, Md.—F. W. Kasselbaum, Jr., connected with the Baltimore Dry Dock & Shipbuilding Company, Baltimore, Md., has developed plans for the building of a terminal on a 200-acre tract of land owned by Frank A. Furst. Construction includes the erection of warehouses, piers and well-planned railroad facilities. Initial expenditure includes $100,000 for bulkhead, $825,000 for covered pier, $1,824,000 for two warehouses with $400,000 for approaches, $126,000 for pier equipment and additional expenditure for railroad heating plants, locomotives, etc. Although the preliminarry cost of the enterprise is estimated at $5,000,000 to $7,000,000, the ultimate plans provide for eight piers and thirty-two buildings, and will entail the expenditure of at least $30,000,000.

Timber Breakwater, Depot Harbor, Ont.—About $34,000 will be spent in reconstructing the timber breakwater at Depot Harbor, Ont. Address E. Lafleur, Department of Public Works, Ottawa, Ont.

Valve Shop, Readington, Pa.—The Bethlehem Shipbuilding Corporation, Bethlehem, Pa., is planning to erect a large valve shop at Readington, Pa. The plant, when completed, will give employment to more than 1,000 men.

Warehouse and Freight Handling Machinery, St. Louis, Mo.—C. E. Smith, Railway Exchange Building, St. Louis, Mo., may be addressed concerning the extension of the municipal docks at that city, including the building of a warehouse 400 by 200 feet, the building of a warehouse extension and the installation of additional freight handling equipment.

Wharf, Bass River, N. S.—About $21,000 will be spent in the building of a wharf at Bass river, N. S. Address E. Lafleur, Department of Public Works, Ottawa, Ont.

Wharf, Francois du Sud, Que.—About $30,000 will be spent in rebuilding the wharf at Francois du Sud, Que. Address E. Lafleur, Department of Public Works, Ottawa, Ont.

Wharf, Quaco, N. B.—About $22,000 will be spent in rebuilding a wharf at Quaco, N. B. Address E. Lafleur, Department of Public Works, Ottawa, Ont.

Wharves, Anse aux Gascons, Que.—About $36,000 and $34,000 will be spent in the construction of two wharves at Anse aux Gascons, Que. Address E. Lafleur, Department of Public Works, Ottawa, Ont.

Wharves, Galveston, Tex.—The Gulf Refining Company, Pittsburgh, Pa., and Port Arthur, Tex., plans to construct docks and wharves near Ninth street, Galveston, Tex. the construction includes a slip of 2[illegible] draft, storehouses and storage tanks.

Generated on 2024-09-12 08:01 GMT / https://hdl.handle.net/2027/uiug.30112004006158
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN